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CONTENTS

Veterinary Service in Russia 449
War and the Spread of Epizootics 450
Poisonous Plant Scares 451
Bacteriophage a Chemical 452
The Main Purpose 453
Vaccination 454
Contagious Abortion in the 18th Century and Now 455
Veterinary Education in the United States 456
Enlarged Prostate Relieved by Castration 457
Antirabic Treatment in Animals 458
Sir Henry Wellcome 459
Intestinal Strangulation 460
Skeletal Disease in the Horse 463
Intestinal Calculi in a Horse 472
Whipworm Remedy Refined 473
Municipal Milk Inspection 474
Veterinary Publicity 476
Symposium on Poultry Diseases 477
Disinfection of Kennels 485
Abstracts from Current Veterinary Literature 487-491

Use of Lentin in Retained Secundines, 487; Treatment for Syngamiasis, 487; An Improved Stomach Tube, 487; Treatment for Satyriasis and Nymphomania in Horses, 487; Lesions of Hog Cholera, 487; Circulatory Disturbances in Colic, 487; Interaction of Vitamins, 488; Mammary Actinomycosis, 488; Treatment for Swamp Fever, 488; Calcium Borogluconate Therapy, 488; Pregnancy Test for Mares, 489; Hormones in the Embryonic Fluid of Cows, 489; Retained Afterbirth in the Cow, 489; Infectious Equine Encephalomyelitis, 490; Tuberculosis in a Dog, 490; Biological Pregnancy Diagnosis, 490; Dogs Never Insane, 491; Cramps in Silver Foxes, 491; Mortality from Removal of Foreign Bodies, 491; Dilation of the Esophagus in Dogs, 491; Vaccination Controls Rabies, 491; Gastric Dysfunction in Cattle, 491.

Handbook for Veterinarians 492

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Sanctorious was the first physician to use a thermometer to measure the body temperature (1582). It was nearly 300 years later (1866) that John Gamgee popularized its use among English veterinarians.

Hagenbeck once had to kill three elephants because rats had gnawed their feet. Rats have been known to kill young lambs and to gnaw holes in the bellies of fat swine. On at least one occasion they devoured a man who entered an unused mine in which the rats were starving.

In 1348 travelers in ships, suspected of having been in cities where Black Death existed, were held in the harbor at Marseilles, France, 40 days before they were permitted to land. Quarantine means forty. From this we get the name applied to an enforced isolation.

Wilhelm Konrad Röntgen, discovered x-rays in 1895 by accident. Inaccurate news of the discovery leaked out and an English merchant promptly advertised x-ray proof clothes for modest ladies. Just to be on the safe side, a New Jersey legislator introduced a bill prohibiting the use of x-rays in opera glasses. A good idea that went wrong, but would have been vitiated anyhow by disrobing acts in modern night clubs.

There are 25 dog publications in the United States, one weekly, one semi-monthly and 23 monthlies.

Soviet Russia now has 8,200 veterinarians and 19,000 "feldschers"—assistant veterinarians—in the employ of the government. It has 23 veterinary colleges in which there are 12,500 students, of whom 1,500 are graduated annually. There are, in addition, 83 training centers with 12,000 pupils which supply 2,400 feldschers annually. It is expected that by the end of the second five-year-plan 5,000 veterinarians will be qualified annually. Women are admitted to the veterinary college on an equal basis with men, and now constitute thirty per cent of the student body. In addition to the veterinarians and feldschers, the service also employs what is known as "veterinary sanitary workmen." Of these 65,000 are now being trained. The total cost of the veterinary service is 300 million roubles annually and is increasing as the service is extended. This does not include the cost of training veterinary specialists, qualified veterinarians who are given post graduate work to qualify them for specialist positions. Healthy live stock is considered one of the fundamental issues in the National Economic Plan of the U. S. S. R.

Vitamin A is essential to all domestic animals and man. The chief symptoms of vitamin A deficiency are: Abortion, severe diarrhea and ophthalmia. Animals in a drouth area suffer from vitamin A deficiency of greater or less degree. They also suffer from mineral deficiency and of course, from under nutrition.

Beach found that an epizootic among chickens characterized by pustule-like patches in the mouth and pharynx and on the mucous membranes of the eyes and nasal passages, was due to the lack of green feed—vitamin A deficiency. Lesions found on autopsy included accumulations of urates in the renal tubules. Yellow corn may be substituted for green feed in the ration of chickens.

Vitamin A is stored in the liver of animals on an adequate ration and such animals may live on a vitamin A deficient ration for a considerable period without harm—swine for 90 days and cattle probably from one grass season to the next.

Birds and man are very susceptible to deprivation of vitamin B. Ruminants are able to synthesize this vitamin and thrive equally as well on a vitamin B free diet as on the same diet to which vitamin B has been added. This is thought to be due to the elaboration of vitamin B by certain bacteria, particularly the organism called *Flavobacterium vitarumen,* in the rumen. Patton found vitamin B essential to maintenance of the appetite in dogs.

Men, monkeys and guinea pigs require vitamin C. Rats, rabbits, chickens, swine and cattle do not require it in the ration. Swine and cattle at least and perhaps some other animals, are able to synthesize this vitamin. Horses and sheep probably do not require it. The requirements of the dog for vitamin C is uncertain. Some investigators regard it as necessary in the ration and others as unnecessary for this animal.

Dogs fed on an otherwise satisfactory diet, in which the fat had been replaced by rancid lard, weighed only two-thirds as much after four months as those fed the diet containing fresh lard.

A chick will gain 350 grams in six weeks on a good grain ration, but will gain 450 grams in the same period if 10% of liver is added to the ration. Pork heart is nearly as effective as liver in stimulating growth, while pork kidney, brain and muscle and wheat germ are only half as effective.

Data accumulated at the Wisconsin station indicate that there is no significant difference in the rate of growth of capons and cockerals, nor in the amount of feed required to produce a pound of gain; and that caponizing is justified only if a higher price per pound can be procured for capons than for cockerals.

Expressed in international units, the vitamin B potency per gram of various uncooked tissues is: Pork muscle, 6.6 (two-thirds that of high grade yeast); beef and pork kidney (each), 4.0; beef heart, 2.6; pork heart, 2.5; pork liver, 1.3; pork lung, beef and mutton muscle (each), 0.5, (only one-thirteenth that of pork muscle) according to findings at the Wisconsin station.

WAR AND THE SPREAD OF EPIZOOTICS

Surra did not occur in Mauritius, a small island in the Indian Ocean, until September, 1901. Up until that time the island had imported its supply of cattle from Madagascar. With the outbreak of the Boer War, the high price of cattle in South Africa attracted the Madagascar trade and a cargo of bullocks from the littoral of the Persian Gulf were imported into Mauritius. Surra imported with these bullocks spread throughout the island killing 5,000 cattle and 4,000 horses and asses within two years. The epizootic was not brought under control till 1922 and the disease has not even yet been wholly eradicated from the island.

Lungworms, *Metastrongylus elongatus,* of swine are among the most injurious parasites in that animal. Heavy infestations cause unthriftiness, resulting in economic loss and in young pigs pneumonia and not infrequently, death.

In the adult or sexual stage the swine lungworm inhabits the bronchi and bronchioles, where the female worms produce eggs in incredible numbers for a period of several months. The eggs are moved up the air passages by the action of the cilia and when they reach the pharynx are swallowed by the pig. They are discharged in the feces. Based upon many careful counts, Schwartz estimated that a moderately infected pig may discharge 3,000,000 lungworm eggs in the feces daily.

Earthworms, which usually abound in hog lots and permanent pastures, ingest the eggs of the swine lungworm with the feces upon which they feed. The eggs hatch and the larvae develop somewhat in the earthworm where they may survive for months. Schwartz has counted more than 2,000 lungworm larvae in a single earthworm. Swine are infested by eating earthworms containing the lungworm larvae. The larvae from a single earthworm may produce a marked infestation in a young pig. The larvae freed in the intestinal tract of a pig penetrates the mucosa, enters the lymph stream and reaches the blood stream. On reaching the lungs, they leave the capillaries, settle down and develop to maturity in about four weeks.

There is no effective treatment for lungworms in swine. All reliance must be placed on preventive measures. Such measures consist in preventing the swine from eating earthworms. Permanent pastures should be avoided since earthworms thrive in them; but are greatly reduced in numbers by the cultivation of temporary pastures. Ringing to prevent rooting is a valuable measure of prevention and an ample, well balanced ration to keep the swine from searching through trash and filth, favorite habitats of earthworms, for food is effective in keeping down the consumption of earthworms. The removal of litter, trash, manure, board boxes and old logs from hog lots is advisable, since such afford harbors of earthworms. Ill kept barns with dirt floors and wet swampy places should be avoided. The same measures are effective against the thorny-headed worm, *Macracanthorynchus hirudinaceus,* with which swine are infested by eating white grubs, the larvae of the May beetle. Temporary pastures and good feeding likewise aid in protecting swine from ascaris infestation.

Carotene is not converted into vitamin by either bacteria or higher plants, but only by animals.

POISONOUS PLANT SCARES

New diseases, as a rule, are only old diseases advertised. A more extensive veterinary literature, a county agent at every county seat and the converging of experiences at meeting of the associations are apt to cultivate the impression that new diseases are constantly coming along while the fact of the matter is that they only seem new to bigger crowds.

In the last two or three years, the reputation of Kaffir corn and cane has suffered wider publicity. Under certain condition of growth the andropogon grasses (Sorghum, broom corn, Kaffir corn, durra, milo, maize, etc.), mobilizes dangerous percentages of prussic acid. Stunted by drought, they are apt to be cyanogeniferous. Years ago Peters (A. T.) and Pammel, whose studies of injurious plants is outstanding, emphasized the variability of cyanogen in forage plants and in linseed and cottonseed meal and cake under certain conditions of preparation and storage.

Pasture plant poisonings, toxic encephalomyelitis (corn stalk disease), and cyanogenic forage injuries, in being dramatized before bigger audiences indicate that veterinary medicine is beginning to fulfil its mission. We should not be carried off with the idea that these occurrences are something new.

Children in a Kentucky school are eating fewer sweets and drinking more milk, since they have observed the effects of a poorly balanced diet on white rats.—*S. N. L.*

By crossing a Russian wild boar with country pigs, German scientists have produced a completely new breed of pig, which is strongly resistant to disease.—*S. N. L.*

Only two states—Arizona and Nevada—had enough horse colts under two years of age, Jan. 1, 1935 for replacements and not a single state had enough mules, based upon an assumption that horses require 15% of their number and mules 13%, under two years of age, to maintain the number of animals in a given territory.

Work horses and mules are produced profitably as an incident to farming—a by-product from mares used in regular work. Only half of the mares bred will produce and rear colts; those that do not will do as much work as geldings. The Horse & Mule Association of America, 407 S. Dearborn St., Chicago, has issued a leaflet recently giving in detail, the number of horses and mules and horse and mule colts in each state, together with trends in production and probable demand during the next few years. It will be supplied free to veterinarians upon application.

Many birds are classed by ornithologists as "social parasites" because they lay their eggs in the nests of other species and thus avoid incubating and rearing their offspring. The cowbird is notorious for this trait, never building a nest of its own, but depending entirely upon other birds for the hatching and feeding of its young. The English cuckoo is another of similar habits. Pheasants, exotic game birds in many states, while in part completing the task of motherhood, are prone, when opportunity offers, to lay their eggs in the nests of ducks. Altogether, more than fifty species of American birds occasionally or regularly deposit their eggs in the nests of other birds.

Eskimos now raise pigs in the Arctic.—*S. N. L.*, 30:802.

During the years 1926-1935 there was a total of 65 deaths from rabies in Illinois, and in 1936 to date there have been seven deaths in the state from this disease. Furthermore, the number of persons requiring prophylactic injections of rabies vaccine has been increasing in recent years. The number treated with rabies vaccine distributed by the State Department of Public Health went up from 1,459 in 1934 to 2,248 in 1935, while during the first seven months of 1936 it reached 1,881. To date this year 9,564 dog bites have been reported to the State Department of Public Health. The extent to which dogs in Illinois have been affected with rabies is illustrated by the number of examinations of dogs' heads which were found to contain Negri bodies, positive evidence of rabies. From January 1 to July 31, 1936, 546 dogs' heads were examined in the diagnostic laboratories of the Department, 191, or 35 per cent of which were found to be positive. Many heads were examined in other laboratories. —*Illinois Health Messenger.*

BACTERIOPHAGE A CHEMICAL

Dr. John H. Northrup of the Rockefeller Institute for Medical Research, announces that the bacteriophages that destroy harmful organisms are not, as has been supposed, a living virus, but a chemical substance—a protein, capable in minute quantities, of causing a lysis of bacteria and also of creating more of itself.

A number of years ago, when Twort and d'Herelle announced the discovery of an agent that would destroy bacteria in test tubes and sometimes in infected tissues, great hopes of its usefulness as a therapeutic agent were aroused; but not fulfilled by experience. However, bacteriophage has continued to be used to a limited extent in combatting pyogenic organisms (furunculosis, acne) with sometimes surprisingly gratifying results. Northrup's discovery of a definite concentrated substance that has this action may facilitate its use.

"PREMUNIZED" MILK

A Hungarian has found that spoilage of milk and other dairy products can be delayed by inoculating them with a weak bacterial flora.—*S. N. L.*, 30:803.

* * * *

Foods containing much sulphur relieve the pain of arthritis, according to the findings of scientists at the Medical College of Virginia. For this purpose a diet containing many eggs is recommended or a diet high in meat content.

* * * *

Dr. Edward Gaul of Columbia University reports an almost complete cure of several virulent cases of psoriasis by giving his patients a diet of fresh fruit and vegetables, with an occasional meal of rare meat and periodic injections of carotin high in vitamin A content.

* * * *

In 1900, not one family in a hundred owned a horse and buggy; today, three out of four have cars. One family in thirteen had a telephone; now, one family in two. In 1900, modern plumbing and central heating were luxuries—less than 500,000 homes had electricity—radio and electric refrigeration were unknown. Today, 21 million homes are wired; 7 million families own electric refrigerators; 22 million have radio receivers.

* * * *

TRY A GRASS JUICE COCKTAIL

Drs. C. A. Elvehjem and E. B. Hart of the University of Wisconsin have discovered that the growth-promoting properties of milk can be markedly enhanced by adding fresh grass juice. Juice squeezed out of lawn clippings was added to the daily milk ration of young rats, causing them to gain weight much more rapidly than "control" rats that got just plain milk.

Liver and brain tissue were also found able to promote growth when added to winter milk.

This finding, if it proves applicable to human nutrition, may point to the desirability of fortifying winter milk with materials containing the growth factor which it lacks. Such additions will not be necessary with milk produced in summer, for cows having access to pasture give a product which is potent in promoting growth.—*S. N. L.*, 30:800.

* * * *

THE MAIN PURPOSE

To insure an amplitude of domestic animals and animal products is the mission of veterinary science, the servant of all of the people—a science accountable to every man, woman and child of a nation, not alone to those who happen to raise live stock.

If the veterinary profession is ever to become the exclusive medium through which veterinary science is utilized, it will earn that rating by being reasonable with agriculture on the one hand and fair with the general public on the other and by agriculture being reasonable with attempts to use veterinary medicine for the general good. The veterinary profession as now constituted is justified in arguing its case before the court of public welfare. We are too apt to think of ourselves as conservators of live stock and public health (to a limited extent) but few within or outside of the professional ranks think of our trust as one of those upon which the Republic actually depends for its existence.

Human welfare and domestic animals are inseparable but, the fact is not generally appreciated or even generally known. "The big idea" is to popularize that too-little-known truth. When that truth is more generally realized the right *modus operandi* for veterinary medicine will come naturally. The people will delegate to the veterinary profession the place it should occupy in the social scheme. Just now, anyone who broaches the subject succeeds only in fulminating a whirlwind of bitter criticism where toes get trampled upon. The questions involved are vast, misunderstood and extremely delicate. They touch everything from salaries and fees to big business to such an extent that a maze of confusion is apt to submerge straight thinking.

The big idea, in other words, is to use veterinary medicine for the thing best expressed as "posterity" not for the personal advantage of veterinarians and farmers, or any other grouping.

VACCINATION [1]

Long before Jenner and Pasteur opened up the field of research from which developed the science of bacteriology, experience had shown that man and animals previously attacked by certain grave diseases, resisted subsequent exposure. This crude, ancient observation underlies all methods of vaccination, old and new. A mild attack of a disease was known to ward off future, perhaps severe, attacks. The idea of giving the susceptible a benign attack was, thereby, born. From the primitive demonstration of Jenner in smallpox there has developed the serums, the anatoxins, the bacteriophages, the bacterins and the attenuated organisms and viruses.

The early attempts to give animals a mild attack by inoculating them with small doses of the specific agent, as Chauveau did with anthrax in sheep, depended so much upon unknown factors—virulence and resistance—that attenuating the virulence to a definite degree became imperative. Pasteur, as all the world knows, achieved that desideratum in two bacillary and one virus disease—fowl cholera, anthrax and rabies. Heat, exposure to air, and then chemical attenuation came into being. Each vaccine comports to a certain special method of preparation. The chemicals used are varied: Bile, saponin and other glucosides, tapioca, formalin, ether, chloroform, etc.

With the exception of rabies treatment, smallpox vaccination and premunition against tuberculosis, living virus, attenuated or virulent, can be used only in veterinary medicine. With the others, there is too much danger in human medicine of recuperating the virulence. Only killed vaccines are used.

These facts gave birth to a new idea—the body can be prepared to fight an infection it does not have, by mobilizing antigenic power without provoking the infection. Contact with living microörganisms is not always necessary to elaborate factors of specific resistance in the body. In other words, the antigenic power of some organisms can be conserved without the destroying pathogenic power. The vaccine virtue is retained, the pathogenic action avoided [anthrax bacterin and blackleg bacterin are two examples]. One cannot, however, claim that the majority of killed pathogenic germs retain their immunizing power. It is well known in veterinary medicine that in so far as the ultraviruses are concerned, only attenuated living material vaccinates successfully. The immunity can, however, be reinforced by injecting stronger material later. Thus it is clear that the original Pasteurian principles continue to prevail. The question is simply one of not destroying the antigenic power.

Besredka added a new thought to vaccination, in copying Jenner and others, when be proposed local vaccination; that is to say, to vaccinate in tissues exhibiting affinity for the specific germ. Thus was created the vaccination of animals against anthrax by the intradermal method and intestinal vaccination against typhoid fever by giving the vaccine by way of the mouth. Aphthisation in foot-and-mouth disease and clavelisation against sheep pox and chicken pox vaccination are other examples of the same type.

Serum simultaneous vaccination [if the serum is homologous] is devoid of all danger and affords more than a mere passing immunity, since the invading organisms elaborate their respective antigens, while the serum protection lasts. Serums also protect the body against latent infections and diminish the power of pathogens. On the contrary, serum-virus vaccination presents the difficulty of equalizing the serum and the virus. If the quantity of the serum is too great, active immunity is not realized; if insufficient and the virus is very active, the vaccinated subject may succumb and new centers of infection may thus be started. Using virus of known activity and identical nature, is not the least difficulty. The multiplicity of virus types enters the situation. In foot-and-mouth disease, if the virus is not polyvalent and in hog cholera if it is more active than that of the locality, failures and accidents occur. Nevertheless, the method has not failed to show merits. The immunity is generally extremely strong. Methods of preparation and application are important.

[1] Goret, P., 1936. De la vaccination; (Vaccination); *Recueil de Médecine Vétérinaire*, 111:3, March, 1936.

In chronic affections, the infection is essentially an immunity. The subject is protected against new infections. Tuberculosis, Bang's disease and piroplasmosis are examples. Perhaps, infectious anemia (swamp fever) of the horse belongs in the same category (Verge). This immunity is different from that entertained by Pasteur. The presence, not the souvenir of the germ, is the protection. The state is premunition, not immunity. The induced protection is a benign, more or less lasting infection of the germ, enfeebled beyond pathogenic power. B. C. G. and live culture abortion vaccine are two examples.

In regard to the value of mixed infection vaccinations, the author cites anthrax and blackleg to illustrate that the body reacts separately to associated vaccines. Besides, mixed vaccines (bacterins) may produce, aspecifically, a cross immunity.

CONTAGIOUS ABORTION IN THE EIGHTEENTH CENTURY AND NOW

"In 1782," says White's Veterinary Dictionary (1830), "all of the cows of Farmer d'Euruse of Picardy misscarried." Chabert, Frandrin and Huzard in their 8-volume work on veterinary medicine published in 1791, report extraordinary ravages of abortion among cows. To these early authors, the causes of "calf slinking" were unwholesome feeds and contaminated drinking water. The *étang* (pond) of the Normandy farmers was pointed out as the probable cause of the disease that was taking so tremendous a toll in calf crops. James White (*op. cit.*) cites an outbreak of five years duration in Gloucestershire that was stopped by fencing in the ponds and digging wells to supply fresh water.

Among the recommendations of these early authors are good feed, clean water, isolation of the suspects burning or deeply burying the aborted fetus and secundines and non-interference with retained afterbirths. Internal medication was pronounced ineffective.

At the Springfield meeting of stockmen and veterinarians in 1936, there was no general agreement as to what to do for aborting cows, although Bang's discovery in 1896 charted a course. It appears quite clear that farmers have been told too much about the "hypo-glassware" plan of controlling contagious diseases and so little about the fundamental principles that the scientific man has put himself at a disadvantage. The rules of disease control in animals have not changed since Lancheci (1711) set down *disinfection, isolation, and slaughter* as the open pathway to success. Improved diagnostic methods and artificial immunization are useful only so far as they dovetail into these measures. If this fact and less technical veterinary medicine had been impressed upon stockmen, veterinarians would not find themselves debating the finer points of medicine before confused audiences. It is unfortunate that the veterinary service of this country is developed upon a plan inculcating the impression that veterinary medicine is a simple affair—a plan that must always compel the doctors to explain their science to minds not sufficiently trained to fathom its intricate ways and means. One of the best arguments against the "direct-to-the-farmer" plan of veterinary service is the embarrassing and vulnerable position in which it puts the scientific man who is called before a skeptical jury of livestock owners to defend the theories of unfinished work. A technical subject still hotly debated among scientific men is not ripe enough to take before the court of public opinion. Of this, the Springfield conference seems to be proof. It was a conference in which veterinarians pitted themselves against one another before a mixed audience instead of behind closed doors. The cause? Making "doctors" who do not understand the provocative complexes of medical science, but who can ask questions no one can answer.—*L. A. Merillat.*

Ida Mellen, formerly employed by the New York aquarium as house physician and surgeon, probably is America's first professional fish doctor. She recently resigned to enter private practice. She is author of three books about fish.

Progress of Veterinary Education in the United States

THE rating of a profession is measured by its educational system. As goes the educational program so goes the profession. The kind and sum of knowledge promulgated, and the use made of it, is the gauge of worthiness. It is, therefore, imperative to understand our veterinary educational system precisely in order to determine in which direction we are traveling on the perpendicular scale. Without a complete survey of the past and present, the prospect of abolishing the flaws is less promising and the future less assuring.

So far as the veterinary colleges are concerned, education in animal medicine has advanced much during the past 16 years or since academic standards were tightened up and they became a unit of the general educational system. Until 1920, it could not have been claimed that the American people were much interested in animal medicine. The small expenditures for veterinary colleges compared with the magnitude of the live stock industry establishes this fact beyond controversy. Veterinary education was either of the unconventional sort or was left largely to private enterprise. The private veterinary colleges, which assumed the right of granting degrees, were abolished, but the unconventional sort of veterinary education goes on with increasing momentum, some of it under public sanction and some of it under unregulated, free-for-all private franchise.

Against the deluge of public literature and short courses on animal medicine, scientific and clinical, intended to edify the public are the activities of the commercial laboratories, lay and professional, and the specialized private colleges issuing certificates of merit to their patrons. The latter are growing in size and influence and seem certain to become more powerful politically than the regular colleges or their equivalents in the universities and agricultural colleges. Politics cut strange capers and is apt to make strange bed fellows.

The main oversight among veterinarians is that the veterinary colleges which furnish the personnel required to maintain a classical veterinary service in one way or other, do but a small part of the total educating. The budget required to conduct the kind of veterinary education, public and private, that is disapproved by the consensus of medical opinion, runs into astronomical figures compared with total appropriations for our ten orthodox veterinary colleges.

To be more explicit, private educators may be divided into three classes:

1. The makers of stock feeds and remedies, some of whom employ capable chemists, dietitians and clinicians to insure scientific production. This private educational system belongs to the big business class. Its units vary in quality, but its magnitude is not conjectural. One of its objectives is to train the consumer (buyer) of their output by means of correspondence, display advertisements, literature and salesmen. Much of the training is, in fact, veterinary medicine and some of the salesmen practice veterinary medicine illegally —diagnose animal disease and prescribe (the products they sell) for it.

2. The commercial firms supplying veterinarians with material and educational literature. This group, too, has developed into the big business class. Its components may be divided into three classes: (a) one cultivating only the patronage of the responsible members of the profession, commonly referred to as graduates of veterinary colleges; (b) one catering to both the graduates and the legally licensed nongraduates, and (c) one making no pretense to upholding the veterinary profession.

The commercial system furnishes a voluminous periodical and some fixed literature of the modern sort, which keeps pace quite consistently with the development of medicine and maintains modern research and production laboratories manned by prominent figures of the profession, who follow, closely, the minutest details of the clinical field and who, therefore, occupy key positions in educational work.

3. The special schools, privately owned and managed and patronized by owners or custodians of animals, which graduate "specialists" in poultry medicine, breeding diseases, etc. Several of these have grown to a size, prominence and influence that forecasts a new kind of animal medicine for the American people. In view of the fact that veterinary practice laws are weak and largely ignored, and that legalized practitioners receive little outside support when they attempt to enforce them, the end to which this fling at veterinary education will lead is problematic. The position of these schools is strengthened by the fact that public institutions, and public officials, issue permits to poultrymen, swine breeders and stallion owners to practice veterinary medicine, including the handling of certain contagious diseases and thus set a bad example.

As a matter of fact, veterinary education which was started privately in 1875 and so continued for approximately 45 years, was then discontinued in one form (colleges) to crop up and grow gigantic in other forms, practically out of all control.

We are probably all too busy safeguarding personal interests to maintain good humor when this delicate subject is broached, or probably its the American tradition of acting only when the catastrophe arrives, because the "stitch-in-time" policy has never been the custom.—*L. A. M.*

VITAMIN B_1 MADE IN LABORATORY

Artificial production by chemical methods of vitamin B_1, the beri-beri preventing vitamin, has finally been achieved by Dr. R. R. Williams of the Bell Telephone Laboratories and Dr. J. K. Kline of the Research Laboratories.

The vitamin, it is claimed, can be produced much more cheaply by the synthetic process, difficult though it is, than by previously developed methods of extracting it from natural sources.

ENLARGED PROSTATE RELIEVED BY CASTRATION

I note that it is stated (*Vet. Med.*, October, 1936, p. 441) that "The treatment of disease of the prostate gland in the dog is dietary, medical and physical."

In my experience, the statement is correct except for three things. The treatment is neither dietary, medical or physical.

This common ailment in the dog, the most distressing symptom of which is suppression of urination, yields immediately and completely to surgery, and with marked alacrity. Even cases that have progressed to complete suppression of the urine frequently show improvement within four or five hours after the animal is castrated, and complete relief within 24 hours.

Castration is a specific for hypertrophy of the prostate gland in the dog.

E. L. QUITMAN.

Chicago, Ill.

Man isn't so smart. Thousands of years before he began to have afternoon headaches from trying to think, the turtle had a stream-lined body, turret top, retractable landing gear and a portable house.—*St. Louis Star-Times.*

RHODE ISLAND FREES ITS CATTLE OF TB

Rhode Island has been designated a modified accredited area by the U. S. Department of Agriculture.

With Rhode Island, there are now 41 states listed as modified accredited areas, in addition to the District of Columbia. Tuberculosis-eradication work in Rhode Island was undertaken about 20 years ago, but the extent of this activity was greatly increased during the last five years. Tuberculosis in cattle formerly existed in that state to a considerable degree, making it a difficult undertaking to reduce the infection to less than 0.5%. Results of the retesting of herds in the state have been very encouraging in showing the effectiveness of the eradication campaign.

MAGGOT STUDY YIELDS NEW FACTS ON UREA

Digging deeper into the recent mystery of how blowfly maggots stimulate healing in stubborn wounds, a fact observed by surgeons during the World War, Dr. William Robinson of the U. S. Department of Agriculture now announces the possibility that urea, a well-known and widely distributed chemical, may be responsible along with allantoin for this remarkable healing produced by maggots. He announced last year the discovery of allantoin in maggot excretions. He now finds that urea is present also. Preliminary tests indicate that the pure synthetic chemical by itself induces the same healing as maggots or allantoin.

In an article appearing in the August number of the *American Journal of Surgery,* Doctor Robinson cites case histories provided by physicians, surgeons and dentists, who have used urea solution in the treatment of osteomyelitis, gangrene, old ulcers, stubborn wounds, infected burns and non-healing gums and tooth sockets. The reports are encouraging.

These physicians and many others became interested in the use of urea through a previous interest in allantoin, which in 15 months has come into extensive manufacture and wide use from the starting point of an obscure and practically unused chemical.

Urea is present in the tissues and blood of animals and humans and is of common occurrence in plants, including many used as food, such, for example, as spinach. However, it got its name from the fact that it was first found in urine, in which form the excess nitrogen is removed from the body. Urea is of great historic interest since it was the first organic chemical ever to be made synthetically. That epoch-making discovery was made more than 100 years ago.

Urea is an almost snowlike, crystalline chemical, and under the microscope a pinch of it looks like a miniature log jam of sparkling stocks of ice. Chemists now make it by the ton by combining three gases which occur in air or water—nitrogen, hydrogen and carbon dioxide.

In the treatment of wounds, urea has been used mostly as a 2% solution, but, unlike allantoin, it is highly soluble and heavy solutions may be made. Pure urea, much used by doctors as a diuretic, sells for only a small fraction of the price of allantoin.

* * * *

ANTIRABIC TREATMENT IN ANIMALS [1]

It is 51 years since Pasteur discovered the specific nature of rabies and first practiced antirabic treatment; the date being July 8, 1885. Although Pasteur institutes, where rabies treatment of dog-bitten persons could be obtained, were established in the principal countries, it cannot be claimed that animals have benefited much from the discovery. As a matter of fact, the institutes refused treatment to any but persons. From that early date to just a few years ago, the veterinarian, obvious as it was to him that animals would respond to the treatment as well as does man, could not even procure the necessary material for treatment until Japanese scientists produced phenol-killed virus and proved its merits by large-scale usage for immunizing purposes only several years ago. Later, the same, or modified chemically killed, vaccine proved its merits in saving the life of bitten animals. The procedure is, however, too new to state accurately the percentage of failures. In human medicine it required many years to prove the merits of antirabic treatment of bitten persons.

In 1935, the veterinary academy of France appointed a commission to report on the vaccination of animals bitten by rabid dogs. The laws of France prohibit such treatment for animals. The dog bitten by a rabid dog is condemned and killed. But, in recent years, there developed tremendous opposition to the enforcement. Neither owners nor veterinarians in practice coöperate freely with the authorities, once it was realized that animals are entitled to, and respond to, the treatment as well as their biped contemporaries. At-

[1] *Bulletin de l'Acadmie Veterinaire de France,* 8:10, December, 1935.

tempts to enforce the "law of destruction" led to violations and evasions.

When the question was brought before the Academy, Drouin, president of the Academy and chief of the veterinary service, defended the law on the ground that the killing of dogs known to have been bitten by rabid animals has practically eradicated rabies from France. Quoting:

"Veterinarians are free to practice antirabic vaccination to prevent animals from contracting the disease, should they be bitten later by a rabid animal. But, France cannot permit the vaccination of carnivores *after* they have been bitten by such an animal. The Institute would, however, put rabies vaccine at the disposition of veterinarians for use in herbivores after they have been bitten by a rabid animal."

Summed up, the practitioners and others in opposing the government's contention, took the stand that in as much as the scientific value of rabies treatment is not disputed, the disease might have been as completely eliminated by treatment as by killing every victim of a mad dog bite. All were in accord, however, that keeping treated dogs under supervision until the longest known period of incubation had passed, would be difficult.

When put to a vote, the Academy supported the government's method by a count of 12 for and two against. In short, a scientific commission delegated to study the question of handling animals bitten by rabid animals, after a heated, open discussion, led to this:

Carnivores cannot, but herbivores may be legally treated for rabies. All animals may be legally submitted to preventive vaccination.

* * * *

THE ELOQUENCE OF SILENCE

The city [Detroit] has many institutions of higher learning of interest to the professional man, whether he be physician, dentist or veterinarian. The medical and dental profession have always stood high in Detroit as well as in the State.—Editorial in *The Military Surgeon*, 79:2.

SIR HENRY WELLCOME

In the death of Sir Henry Wellcome, which occurred July 25, 1936, in London, not only anthropology, but medical and biological sciences in general, lost a devoted benefactor. Sir Henry was 83 years old. He was born in 1853 in a log cabin near Almond, Wisconsin, and spent his youth in this country. In 1868 he began his career as a pharmacist at Rochester, Minn. At a gathering in Rochester last year, he said: "I owe whatever success I have attained in this world to Dr. William Worrall Mayo." He referred to the father of the famous Mayo brothers. In 1874, Sir Henry graduated from the Chicago College of Pharmacy, and later from the Philadelphia College of Pharmacy. He then went into the retail drug business in New York City and in 1880 with Silas M. Burroughs, established the firm of Burroughs, Wellcome & Co. in London. He continued his interest in America and was a member of many American scientific organizations. Secretary of War Dickinson appointed him to make a survey of the Canal Zone during the construction of the Panama Canal. His report helped to secure a free hand for Surgeon Gorgas in continuing his monumental sanitary work in Panama. During the World War, he placed his scientific institution at the service of the British government and equipped and supplied a chemical and bacteriological motor field laboratory, to the British Army Medical Service. During the war, he became a British subject by naturalization. Twenty-five years ago he undertook important archaeological work in the Sudan, near Khartoum. Excavations were carried out under his personal direction by a staff of 25 Europeans and more than 3,000 native workmen. He also established and maintained medical research laboratories in that city and was highly honored for humanitarian work carried on among the natives of Africa. In London Sir Henry founded the magnificent Wellcome Research Institution for the advancement of medical science.

Intestinal Strangulation

By J. F. DE VINE,
Goshen, New York

THE differential diagnosis of acute gastric and intestinal ailments has long intrigued me and the splendid talk on this subject given by Dr. H. R. Potter of Stamford Center, Ontario, at the annual meeting of the New York State Veterinary Medical Society at Buffalo (July 16-17, 1936) has lighted up, so to speak, my old interest and I shall here quote excerpts from a paper which I presented nearly two decades ago at the A. V. M. A. meeting in Kansas City, August 1917.

I first want to add that Doctor Potter's explanation of regurgitation in these cases being an indication of intestinal obstruction and that the sooner this symptom appears, the more anterior the obstruction, was a splendid barometer of the thoroughness of this man's observation and should receive more than passing commendation. We all know veterinarians who treat cases, day in and day out, in a perfunctory manner with such indifference that they gain no information for themselves or others, but when a man observes every expression and action of a seriously sick patient, you may feel assured he is going ahead.

Following are excerpts from the paper referred to, the title of which was: "Volvulus, Intussusception and Hernia through the Omentum in the Horse Diagnosis."

"All authors I have read, even such capable authors as contributed to the recently published "Colics and Their Treatment" pass rather lightly by diagnosis of these ailments. One whom I regard as particularly capable states he has "never been able to find these conditions except at the post mortem examination."

"In my early days, while serving as an assistant to other practitioners, I established a custom which is still pursued at our office and that is to keep in close touch with all so-called colics until they are better or dead. It was, and is, likewise our rule to autopsy fatal cases. This practice was comparatively simple as rendering plants were accessible or the carcass could easily be disposed of on the farm.

"We kept careful records of colics treated, until we had autopsied 44 fatal cases; 28 of which were twist of the small intestine, three hernia through the omentum, one hernia through the diaphragm, eight cases of invagination of the small intestine within itself, one into the cecum of the newborn colt and torsion of the larger bowel accounting for but three of the 44.

Careful Observation Worth While

"In treating cases, it was my desire to differentiate, if possible, between the positively hopeless cases and those that had a chance of recovery with good, intelligent care and medication.

"By the use of the stomach tube and careful observation of the pulse, temperature, rectal examinations and close scrutiny of every movement of the suffering animal, I began to feel that I could determine with reasonable accuracy the cases that were intestinal rather than gastric.

"I have no admiration for the offhanded diagnostician, but I have for the capable veterinarian who is keen enough to sense that a condition not amenable to treatment exists and who explains to his client in an honest, courteous way that since certain characteristics indicate the illness will terminate fatally, consultation would be welcome, if it be the owner's desire. After the veterinarian has done this and death follows, if he can by autopsy verify his diagnosis to those concerned, there is little danger of the loss of the client.

Significant Symptoms

"To get to the point, let us imagine ourselves in the presence of a horse suffering from hopeless intestinal obstruction, be it due to volvulus, hernia or invagination. The symptoms are practically the same, except that in the first and second, if there is much involvement, death ensues earlier.

"What we observe upon our arrival will depend upon how long the animal has been suffering. Say the attendant tells us the pa-

tient was taken some 30 minutes previously with sudden and severe colicky pains.

"He now throws himself violently, jumps up, then down again and when down rolls on his back with short periods of ease, or he may sit on his haunches as seen in impaction of the colon or diaphragmatic hernia. The latter is but a form of strangulation and naturally is attended with the same acute suffering as the group we are discussing. He strains, stretches and passes a small amount of feces. This, too, is indicative of colon impaction, but may be construed otherwise on account of the acute pain and negative rectal findings. Then, too, in the case of severe colic in stallions and even geldings every experienced practitioner looks for strangulated hernia, an early diagnosis being positively imperative if it is to be relieved by surgical interference; hence the necessity of early and perhaps repeated rectal examinations.

Symptoms at First May Simulate Other Ailments

"It is true that the trotter, hunter, thoroughbred or show horse, after unusual excitement, workout or race not infrequently suffers from spasmodic colic. The symptoms may be as acute and confusing as in the onset of strangulation, so it is quite natural that in all colics we administer our favorite remedy. The simple colics respond rather promptly to such treatment and even in mortal obstructions we may get what appears to be fair response from the first dose, the animal becoming quieter or possibly really quiet for a few minutes and then off again on his march of pain. The result of further medication is not so well marked. Our patient continues to grow worse and all symptoms are aggravated—the pulse small, hard and fast; the eyes glassy; the face muscles drawn; nostrils pinched and the abdomen tucked up. He will lie on his back for a few minutes, jump up, walk hurriedly around the stall, stop, back up in the corner, swing his head up and down, breathe short, fast and heavy with a semi-grunt at each expiration. He sweats, at first, around the head and neck, but soon the whole body becomes so saturated that water actually drips off him, this finally giving way to a cold clamminess. He may or may not bloat slightly. If he does, tapping gives temporary relief. He points with his nose rather low in the flank, holding it there perhaps a minute or more at a time. This is also a symptom of large bowel involvement and of strangulated hernia, but rectal examinations should long since have eliminated these and other confusing factors. For instance, torsion of the large bowel may usually be verified or dismissed, while if the small intestine is tied off, it gradually becomes filled with gas and not infrequently can be felt plainly, very much like an inflated inner tube.

"The temperature now begins to rise from two to five degrees. There is less and less inclination of the patient to throw himself down or even to lie down at all, due probably to a complicating peritonitis, so he walks blindly around in the stall, knocking his head in the corners until it is painfully bruised and abraded. We also note, about this time, a characteristic which is quite constant—an occasional neigh at familiar sounds, such as footsteps, the opening or closing of a door, or movement of his mate. If, through a humane act, he be removed to a paddock he will walk or trot about, neighing now and then. At times he sways as though about to fall when he may stop and spread all four legs, as if to prevent falling, starting off again until finally from exhaustion he goes down. However, it is not uncommon to see periods of apparent relief in such cases, just before death, if they do not die of shock before the bowel becomes cold and gangrenous.

Summary

"The particular aids in diagnosis are:—

1. The early acute pain, the hard, small pulse and the distressed look.

2. The desperate condition and lack of pronounced gastric symptoms.

3. Frequent passing of small amounts of feces.

4. The constancy of the acute pain, being fully as acute as in intestinal calculus, the latter, however, usually having periods of ease.

5. The violence in lying down in con-

trast to the cautious movement in peritonitis.

6. The apparent inertness of all drugs after the effect of the first dose or two wears away.

7. The straining and stretching as seen in impaction of the colon, in the absence of this condition.

8. The pronounced desire to lie on the back or sit on the haunches.

9. Finding by rectal examination either torsion of the large bowel or inflation of the small bowel.

10. The swinging of the head up and down.

11. The profuse sweating, becoming cold and clammy as the end draws near.

12. Some elevation of temperature, the tucked up abdomen and more caution in lying down as peritonitis becomes a complication.

13. The growing tendency, as the case advances, to continue walking and the peculiar position assumed while walking, sort of doubling up with the appearance of the hind parts being shoved ahead. This can be likened to the position a man suffering with acute abdominal pain assumes when walking.

14. Holding the nose against the abdomen which is pathognomonic when associated with the other symptoms recited.

15. Occasional neighing as he nears death."

We would now add a 16th, which Doctor Potter so vividly described—regurgitation.

WE BELIEVE this to be a fairly accurate picture of intestinal strangulation from the beginning of the attack until relieved by death; but we do not think it humane or necessary to allow an animal to live on under such suffering, so we always advise destruction as soon as we are reasonably certain of our diagnosis.

Differential Diagnosis

There are a few simulating conditions that are not necessarily fatal that must be taken into account and weighed carefully. We have referred to inguinal hernia. Intestinal calculi may and do cause severe colics, but if in certain locations and not large enough to immediately imperil the life of the animal will usually respond to anodynes and oils. If, however, a large calculus should become firmly incarcerated for a long period, death is just as certain as in other forms of strangulation. Fortunately such large calculi, if in the large bowel, can be located.

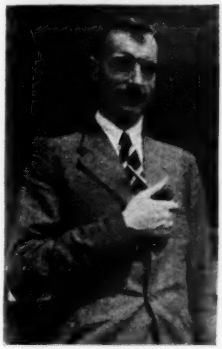
For the experienced practitioner there should be little trouble in differentiating impaction of the colon even though the animal may sit on its haunches or stretch, remembering these are also symptoms of strangulation. In colon impaction the pain is far less acute; is often intermittent and then, too, helpful information may be had from rectal examination.

We are all aware that occasionally what starts out as a case of benign abdominal pain may terminate in a more serious condition. In fact, it is highly probable that most cases of strangulation begin as simple colics, which is a very good argument why colic cases should not be allowed to roll.

Two Unusual Cases

I recall watching, with a proud owner, a family horse that was turned in a paddock that we might see him in action. After capering about with head and tail in the air, he lay down, rolled with much vim from side to side and a few minutes later was in excruciating pain. He died the next day from the effects of a torn omentum and torsion involving sixteen feet of small intestine.

A few years ago, in consultation, I saw a world renowned, three-year-old trotter that had been suffering for about 24 hours with mild abdominal pain. During the first few hours, the stomach tube gave instant and complete relief for a time, so much so that he drank a little water during those periods of ease. He did not, however, respond to treatment, but grew gradually worse dying on the fourth day. Autopsy revealed four feet of the anterior jejunum herniated through the omentum. This was probably brought about by playful rolling in the stable. Its location accounts for the relief at first by the stomach tube; the small amount of intestine incarcerated explains the delayed death.



Prof. Wm. Mitchell

Conditions Mentioned in the Horse Breeding Acts*

By W. M. MITCHELL, M.B., Ch.B., B.Sc., M.R.C.V.S.,
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The Horse Breeding Acts in Great Britain are founded upon the evidence given before the Royal Commission on Horse Breeding[1] in 1889. At the request of the Commission the Council of the Royal College of Veterinary Surgeons prepared a report stating what defects and diseases should be considered as hereditary, the report being drawn up from the answers received to a questionnaire issued to all veterinary surgeons on the Register. Only about 300 replied, though over 2,000 circulars were sent out.

This report by the Council of the Royal College of Veterinary Surgeons was the basis upon which all persons were examined who gave evidence before the commission. Eight of the 33 witnesses were eminent veterinary surgeons.

The regulations made under the Horse Breeding Acts in England and Scotland prescribe the same diseases or defects as rendering a stallion unsuitable for service of mares, namely—cataract, roaring, whistling, ringbone (high or low), sidebone, bone spavin, navicular disease, shivering, stringhalt and defective genital organs.

From examination of the evidence given before the Royal Commission it is very noticeable that practically all the witnesses had a firm belief in the direct genetic relationship of each specific disease condition, e.g., that a sire with a spavin was liable to produce progeny which would develop spavins.

The belief that these conditions are distinct disease entities is still common among veterinary surgeons and others in this country, though on the Continent Joly, Jacoulet and Vivien, according to Liénaux[2] have for nearly 30 years regarded the various osseous defects of the horse—such as splints, spavins and ringbones—as local signs of a general osseous predisposition to disease to which Joly gave the name "ostéitisme."

From my own investigations, the results of which have been published from time to time, I have gradually come to include in one category "Rheumatic Disease of the Horse," not only the chronic osteo-arthritic conditions prescribed in the Horse Breeding Acts but all the other conditions, with the exception of defective genital organs, upon which I have practically no evidence.

The condition "shivering" was the starting point of my investigations, and I will briefly outline how I have come to the conclusion that all the above-mentioned conditions are merely local manifestations of a general disease.

Shivering has long been assumed to be due to some disease process affecting the nervous system, but concrete evidence of pathological damage in this system has previously been wanting. McCall[3] recorded the results of the microscopic examination of the brain, spinal cord and superior dorsal nerve roots of a six-year-old harness gelding suffering from shivering, carried out by Drs. Mackenzie and Marshall in the Western Asylums Research Institute, Glasgow, but no abnormality was detected. In reply to the discussion on his paper he reported a similar investigation of the brain and spinal cord of a bad shiverer in the County Asylum at Manchester (on behalf of Mr. Wolstenholme), and again nothing abnormal was found. This negative evidence concerning the central nervous system has been confirmed by Dr. Biggart, Neuropathologist to the Royal Infirmary,

* Presented at the Fifty-fourth Annual Congress of the National Veterinary Medical Association of Great Britain and Ireland, September 14-18, 1936.

Edinburgh, who has examined portions of the spinal cords of four of my cases. With McCall's experience before me my attention to a new line of investigation was directed towards the possibility of the ventral roots of the spinal nerves going to form the lumbo-sacral plexus being pressed upon by exostoses in the region of the intervertebral foramina. This possibility was confirmed in my first series of post mortem examinations which were made on old horses, but when young horses were examined no evidence of pressure upon nerve roots was found.

About this time I began to appreciate the fact that horses affected with shivering frequently showed other clinical signs of unsoundness, such as grunting, bog spavins, thoroughpins and sidebones. Subsequent post mortem examinations were therefore made in a more exhaustive manner.

After inspection of the main peripheral nerves and preservation of representative portions of them for microscopic examination, the bulk of the muscle was removed from the bones, which allowed all the joints of the limbs and many of the vertebral articulations to be examined in the fresh state. In some cases the whole or part of the spinal cord was removed, and in all a survey of the internal organs was made and portions taken for microscopic examination. After removing the more interesting pathological lesions, chiefly of joints, for preservation in the fresh state, the remainder of the skeleton was boiled. Inspection of this afterwards often revealed bony changes overlooked during the actual sectioning of the body. In order to keep the survey of the various parts of the body as complete as possible all the anatomical systems of the body were scheduled in book form, leaving space to enter findings. Besides completed schedules I have retained the most interesting post mortem findings preserved in the fresh state, the whole boiled-out skeleton of every horse, and microscopic sections of numerous tissues of the body of most of the horses I have examined, so that there is still available for verification the material upon which my opinions are founded.

Though shivering was the condition originally investigated, the frequency with which other clinical conditions were present in horses which were shiverers led to a similar examination of horses which showed no sign of shivering, but which were destroyed for such conditions as navicular disease, ringbone, partial paraplegia ("jinked back") and stringhalt.

In all these cases, no matter whether the horse was destroyed because he was a shiverer or for one of the other conditions, the pathological findings are much the same—widespread bone and joint lesions and a disseminated local degeneration of peripheral nerves.

Why all horses with osteo-arthritic conditions do not show one or other of the various clinical nervous lesions such as shivering, stringhalt, roaring or grunting, it is not easy to explain, but it appears to be a matter of degree of nerve fibre degeneration. I have never seen a peripheral nerve where all the nerve fibres in a bundle are destroyed, though as many as two-thirds of the nerve fibres may have disappeared in a transverse section of an affected nerve.

Here, then, is a problem, namely the investigation of shivering, which at the outset appeared to be a neurological one, which has led me to link up most of the conditions scheduled in the regulations of the Horse Breeding Acts and many other disabling conditions in the horse not included in them. My contention is that all these conditions are merely local manifestations of one general disease, and as I know of no comprehensive name which would include them all, I have suggested that the term* "Rheumatic Disease" be applied to them, though I have expressed the hope that in the not-too-distant future this term will disappear and the disease be named more in accord with is true cause.

When the multiplicity of gross pathological changes occurring throughout the

* This term has been used previously for this disease and discarded. H. S. James (St. Louis, 1886), said: "The resemblance to a rheumatic attack is very close." and "The possible existence of osteoporosis should always be allowed for in diagnosing troubles that are apparently rheumatic." A few years later Bittner (Indiana) stated that in the early stages it could be differentiated from rheumatism only by an examination of the urine. A high elimination of phosphorus in skeletal disease being the differentiating factor.—Ed.

body, in joints, bones and peripheral nerves, is considered, the surprising thing is the complete absence of obvious pain shown by so many animals affected with "Rheumatic Disease." The disease process is more in the nature of a degenerative one than an inflammatory one, and this is upheld by the absence of leucocytic infiltration in congested and hypertrophied synovial membranes and in the common lesion found in peripheral nerves. From a closer study of nerve lesions I desire here to correct the mistake I have made in previous papers in calling the nerve lesions a peripheral neuritis. The lesions are not inflammatory but purely degenerative and localized to patches of peripheral nerves. The difficulty is to understand how the fibres disappear in patches, and why the fibres above and below such patches still appear to be normal.

Underlying the pathological changes in joints, bones, nerves and the various additional lesions which are met in the soft tissues such as fibrositis of the terminal portion of the oesophagus, gastric ulcers, hyperplasia of lymphoid tissue, there is an alteration of the normal blood supply brought about by some as yet unknown toxic agent or agents causing vaso-dilatation. The activity of this agent or agents varies. When the degree of activity is pronounced the general disease gets progressively worse and in these cases pathological lesions are associated with congestion. But periods of activity are often followed by periods when apparently the toxic agent or agents are relatively or absolutely inactive, the disease remains static, and the effects of the damage already done may be seen in compensatory changes in joints in the form of "lipping." It has, however, not been possible to recognize regeneration of nerve fibers in grossly damaged nerves.

The pathological investigation has been based upon the careful post mortem examination of 46 horses suffering from various clinical manifestations of this common disease; this total is made up as follows:—

Destroyed for Shivering	23
Destroyed for Partial Paraplegia	7
Destroyed for various other localized conditions	16

In addition, innumerable partial examinations have been made when time and opportunity did not allow of complete dismemberment of a carcass.

Clinically the insidious way in which the disease may commence and progress is only too well known: starting perhaps with a suspicion of deviation from the normal, followed by some definite single clinical lesion and later, at longer or shorter intervals, by other clinical conditions in other parts of the body. We also recognize cases where after the development of one or more clinical lesions active disease may be arrested and nothing more may develop for years, the horse giving useful service.

General consideration of clinical and pathological facts has of necessity been brief, but I trust it has been sufficient to explain a conception of the majority of the disease conditions prescribed by the regulations of the Horse Breeding Acts as a generalized disease of the horse.

The question of causation of the common disease is a much more debatable one.

Etiology

One of the striking features noted during the post mortem examination of young horses suffering from shivering has been the discovery of many subclinical lesions in joints, bones and nerves, and this has led me to believe that the prevention of development of "Rheumatic Disease" required that greater attention should be paid to the maintenance of health in the ante-natal and early post-natal periods of life if we wish to produce horses which will sustain the wear and tear of work later in life.

Even with the most perfect hereditary history of sire and dam, disaster in the form of rheumatic disease often overtakes the progeny, and this frequently makes its appearance prior to training.

In the early period of the life of a foal, growth of tissues is very rapid and, for correct development, nutrition must be as perfect in quality as possible. The absence of certain qualitative factors in the diet of the dam may so alter the metabolism that a pathological condition of the developing tissues may have a profound effect upon the subsequent health of the animal. In the mature animal, when the tissues are fully

formed, the same deficiencies in the diet may result in various defects, but they are not so important as in a young growing animal.

It is through the more recent knowledge concerning nutrition that a new hope has arisen for the prevention of the unsoundnesses of the horse, largely because experimental science has shown that there are qualitative factors—minerals and vitamins—in foodstuffs which, if wanting or deficient in amount, may have profound effects on general health.

In the light of present-day knowledge the evidence of the well-known trainer, John Porter, of Kingsclere, Hampshire, given before the Horse Breeding Commission, is very significant. He said, "I think the chief cause of roaring is early foaling. I do not think you would find a horse foaled in May a roarer. I think if you were to take all the racehorses in England foaled in that month you would not find a single roarer." In answer to a further question, whether forcing at an early age has any effect upon racehorses, he replied, "I think it is the early forcing; the foal is born at a time when he is exposed to climatic influences that affect him perpetually." He further added, "I should say that you want your foal when you have got natural food, when you have got natural grass, and you do not get natural grass before April 1st."

This evidence of Porter's regarding roaring supports my contention that the ante natal and post-natal periods of life, when growth is most rapid, are the periods when the greatest care should be taken to see that perfect nutrition is obtained; and if his statement is true regarding roaring, then the other wide manifestations of rheumatic disease are as likely to be prevented in the same way.

In addition to the prevention of disease by natural feeding, we all know how beneficial a run at grass is for the horse suffering from many of the osteo-arthritic conditions, often restoring an animal to a further period of useful service. The preventive and curative effects of natural feeding have only within the last 20 years come to be recognized as due to some inherent specific curative factors, whereas previously the benefit was thought to be due to palatability for a jaded appetite or the ease with which it was digested.

As already stated, the qualitative factors in diet which have come to be regarded as of importance in preventing or curing disease can be placed in two groups, minerals and vitamins, but whether deficiencies in either of these groups actually excite or predispose to rheumatic disease in the horse has not yet been proved. These two groups of likely deficiencies will now be examined.

Mineral Deficiency

Theiler and Green in their monograph, "The Osteo-Dystrophies of the Domesticated Animals," draw attention to the close relationship of the general disease conditions affecting the skeleton of the horse in Europe and the disease of Osteodystrophia fibrosa which is met with in South Africa, the Philippines, Japan, China, Ceylon, and which has been proved to be due to a $CaO:P_2O_5$ imbalance of the diet. This disease has in the past also been referred to as osteomalacia, osteoporosis and bran disease of the horse, and in the countries mentioned there is often a rapid development of facial lesions.

In the early stage the disease is marked by intermittent shifting lameness which is diagnosed frequently as spavin or ringbone lameness, arthritis, neuritis, rheumatism, etc. In this country we do not meet the clinical lesion which is regarded as pathognomonic of osteodystrophia fibrosa, namely, the swelling of the mandible and face bones which produces the big head; but it is possible that what we are observing in the group of conditions under consideration to-day is a more chronic form of this disease.

Greenlee and Beenan in Indiana, according to Campbell[4] have found hidden lesions of joints and bones without lameness, nerve trunk lesions and ulcers in the cardiac portion of the stomach of proved cases of osteodystrophia fibrosa, such as I have recorded in horses in this country suffering from rheumatic disease.

The solution of the mystery which previously surrounded osteodystrophia fibrosa resulted from direct feeding experiments in Ceylon, South Africa and in the Philippines—the experiments of Kintner and Holt[5] in the last country being very exhaustive. So long as the $CaO:P_2O_5$ ratio in the diet does not exceed 1:1·8 the disease is prevented; but the more divergent the ratio the more rapidly clinical signs of the disease develop.

Theiler and Green[6] give two reasons for osteodystrophia fibrosa not appearing on a large scale in Europe, although horses receive a diet rich in grain.

The first reason is that pastures and the type of hay often rich in legumes are comparatively rich in calcium. The second reason is that the favorite grain fed to horses in Europe is oats, which of all cereals is the one in which the $CaO:P_2O_5$ is the highest (about 1:7 compared with 1:15 in maize).

Linton[7] has shown, however, that hay in this country is of very variable quality so far as its $CaO:P_2O_5$ ratio is concerned, and there is every reason to believe that when oats and a poor quality of hay is fed, this ratio very frequently departs from the 1:1.8 ratio laid down by Kintner and Holt in the Philippines below which disease developed in their experiments. When natural feeding—grass—is the sole source of nutrition the likelihood of the $CaO:P_2O_5$ ratio being outside the 1:1.8 ratio is unlikely, and it may be that the germ of truth in Porter's observation that among racehorses foaled in May you would not find a single roarer, which implies that grass is the diet which prevents the condition developing, depends upon this ratio in grass being suitably balanced.

That all grazings are not capable of preventing disease has for long been known. Liénaux[2] refers to articles by Drouin in 1903, Dumas in 1896 and Pécus in 1903, in which bone and joint troubles, disease of ligaments and tendons and fractures of weakened bones occurred in horses grazed on marshy lands, which are variously attributed to mineral deficiencies. Drouin and Dumas blame deficiency of phospate in the soil, but Pécus puts the trouble down to want of lime.

Vitamin Deficiency

Ever since I first started to investigate the group of conditions I now call "Rheumatic Disease" the possibility of vitamin deficiency having something to do with its causation has attracted me. Up to the present there is no definite proof that the horse suffers in any way from a vitamin deficiency; nevertheless, it seems inconceivable that the horse, of all animals, should be such an exception.

The knowledge of the vitamin content of foodstuffs has been gained chiefly from feeding experimental animals, such as rats, rabbits, guinea-pigs and dogs, on diets complete in every way but for the particular vitamin under consideration.

Tables are available which permit of diets being checked as to their content of all the known vitamins, and any deficiency may be made good by substitution of foodstuffs or by concentrated preparations of vitamins.

It has been pointed out repeatedly that oats and hay, the common diet of the horse in this country, is liable to be deficient in vitamins A, D and C, and of these vitamin A appears to be the most important.

The widespread clinical and pathological signs met with in the horse have many points similar or closely analogous to the widespread lesions which occur in experimental animals fed on diets deficient only in vitamin A. This experimental evidence has been dealt with in previous papers.

The usual source of supply of this vitamin A for the horse is, as Porter has called it, natural food—grass. Hay, if rapidly dried so that it retains its green color, may contain appreciable amounts of vitamin A, but under the climatic conditions which often prevail in this country, necessitating many days' exposure to the weather before being fit to store, the vitamin A content is liable to be destroyed by oxidation, so that very often horses must get very little or no supply of this vitamin in their food.

Fortunately, a certain amount of storage of vitamin A takes place, especially in the liver, when supplies are plentiful, and such reserves may be sufficient to maintain a normal metabolism long after the source of supply has failed. Last year at Belfast I reported the estimations of vitamin A content in the liver of horses carried out by my colleague, Professor Linton, in which he showed that the liver of many of them contained little or none.

If this vitamin A is necessary for an ideal diet, it follows that mares with no reserve in the liver and kept on a diet wanting in it will not be able to supply the foal developing *in utero*; and it seems reasonable to assume that the physiological metabolism of the rapidly-developing fetus will not be maintained and that pathological abnormalities are liable to occur.

Meigs *et al.*[8] have shown that cows will calve prematurely and will throw dead or weak calves when fed for long periods on rations deficient in vitamin A, even although such rations may contain adequate quantities of calcium.

If vitamin A deficiency causes such disasters in pregnant cows, may not the same deficiency, which we know occurs in horses, account for the parallel disasters which occur only too frequently in pregnant mares?

The early post-natal health of the foal probably also depends upon a supply of vitamin A in the milk of the dam, and the truth of Porter's assertion that a May foal never becomes a roarer may be due to the vitamin A value of the milk which a mare is able to produce from the natural feeding she gets at this time of the year.

Chick and Roscoe[9] have proved that in the cow the vitamin A content of the milk was found to be dependent on the diet of the cow, being at a maximum when the cow was fed upon fresh green food and least when the cow received a winter feed of cereals and roots.

This spring Professor Linton has been following up the vitamin A problem by examining the colostrum of mares. At the time of writing this paper the results are not complete, but I trust he will be able to report to the Congress in September.

Vitamins D and C, I will not discuss, as the conditions we are considering do not show any close parallels in experimental evidence. This does not mean, however, that they are of no importance and can be neglected when direct experimental work on nutrition and disease in the horse comes to be carried out.

Infection

In the horse we recognize closely-allied affections of the respiratory system which are spoken of variously as nasal catarrh, pharyngitis, strangles, town fever and influenza. The gaps in our knowledge regarding these infections I leave to others better qualified to deal with them, but the relationship of these infective conditions to the group of conditions under discussion is often abundantly clear from clinical observation. Roaring is quite a common sequel to a mild attack of any of these febrile conditions. Again, we can all recall the disastrous series of clinical lesions, such as roaring, bog spavins, splints, ringbone, and general loss of elasticity of gait, which may succeed one another or occasionally develop simultaneously in a young, sound horse on coming into town work from the country, and all within a year.

There is no doubt that such febrile attacks at least hasten, if they do not initiate, the development of many of the so-called hereditary diseases.

It should not be forgotten, however, that vitamin A, which is often deficient in the diet of the horse, has been called the anti-infective vitamin, and its lack leads to weakening of the functional integrity of cells covering the body surfaces, thus lowering the protection of the body to infections. The significance of the frequent occurrence of lymphatic hyperplasia in the diffuse tonsillar tissue in the pharyngeal wall and posterior part of the dorsum of the tongue, may depend upon functional depreciation of tissues in this region from vitamin A deficiency, allowing virus and streptococcal infections easy access in what is apparently a vulnerable site in the horse.

In a similar way the resistance to infection of a newly-born foal may be so poor, because of an inadequate supply of vitamin A during fetal life, that it readily falls a victim to joint-ill.

General Hygiene

Under this heading I will very briefly deal with housing and ventilation in a very general way.

The dark, damp, badly-ventilated stable must not be forgotten in the effort to prevent disease. The experience of those who served in France during the World War taught us the value of fresh air in protecting horses from respiratory disease. It was the rarest thing to meet with even a slight catarrh in horses serving with Divisions in the field so long as they were not stabled in civilian stables, and this in spite of exposure to all the rigors of winter. Far too many stables are still deficient hygienically; they may be fairly airy during the day, but at night are converted into hothouses when doors and often ventilators are closed, and horses out of such stables, when exposed to changeable weather while at work, fall ready victims to infections of the respiratory system.

Strongylosis

From the start of my investigations of rheumatic disease one of the outstanding post mortem findings I have recorded in the many horses examined, young or old, has been the presence of some degree of verminous aneurysm affecting the cranial mesenteric artery. The amount of interference with the function of the bowel by the mechanical narrowing of the main blood supply is difficult to assess, and I might add there is also the possibility of the nervous control being interfered with by the associated fibrosis in this region, but without a healthy functioning bowel the general nutrition must inevitably suffer.

The ubiquity of strongylosis in horses makes one wonder if the benefit derived from a run at grass is not largely annulled during the following winter by the infection horses are liable to acquire in the summer, particularly on the old pastures which surround our country houses where horses are grazed year after year.

Trauma

It has been well said that all our lives we are waging a struggle with gravity and that in the end it is by this force we are finally lowered to the grave. The better the general health of either horse or man to withstand the stresses and strains resulting from the force of gravity the longer the period of useful service.

I have been taken to task for my apparent neglect of the importance of trauma and by this apparent neglect, for belittling the work of past generations of clinical workers.

Smith[10] expressed the doubt he had in explaining the appearance of the so-called specific joint diseases in the horse solely by strain or concussion in the following words: "After all, though we have attempted to reason in this imperfect manner on the form and function of the limbs as throwing light upon its diseases, yet we must confess that when applied to the bulk of the equine race it is extremely unsatisfactory.

"It does not account for horses suffering from spavins, ringbone and even navicular disease, which have done practically no work. It increases the mystery of how it is that joint, *viz.*, hocks and coronets, notoriously diseased, yet stand work, and we are compelled to fall back upon even less satisfactory means of explanation than that we have offered above."

I have gone even further than Smith on the question of work and would point out that my pathological evidence embraces facts gleaned from horses as young as one year old, where no question of work enters, and that I suspect that depreciation of the structural integrity occurs even at an earlier period. The importance of trauma in the group of conditions we are considering appears to me to be a factor of secondary importance when the pathological conditions are scattered throughout the body in numerous bones and joints, peripheral nerves, lymph glands, stomach, oesophagus, etc., a distribution which I can only attrib-

ute to some alteration in the normal blood supply.*

Trauma I regard as an exciting factor which precipitates the appearance of many of the clinical lesions which interfere with a horse's usefulness, but I believe that defective nutrition in the early stages of development is the predisposing factor which weakens the tissues and thus renders them susceptible to other factors, among them stresses and strains, which in an animal perfectly healthy would not result in clinical defects appearing so early in life.

Heredity

In view of the generalized nature of rheumatic disease in the horse I am very skeptical about the inheritance of specific conditions which would imply some specific defect in the germ cells. At the most I would admit that what is inherited is a general predisposition to disease in the nature of a weakened metabolism, but this inheritance requires appropriate stimulus in the form of some harmful extraneous factor, such as deficient diet, infection, bad hygienic conditions or trauma, or perhaps a combination of these factors, before the disease process is set going.

Constitutions differ just as temperaments, but with the newer knowledge which we have of preventive medicine, particularly in the field of animal nutrition, there appears to be hope of rearing and maintaining healthy stock which will withstand better the strains and stresses of work and the risks of infection.

I believe that a large amount of the unsoundness met with in horses is due, not so much to a hereditary predisposition to disease as to a hereditary tradition of wrong feeding.†

Conclusions

The regulations framed under the Horse Breeding Acts have done more than anything else to lead to the general belief among all interested in horses that the various conditions prescribed as rendering stallions unfit for service are definite hereditary entities.

The relationship between the conditions regarded clinically as nervous in origin—namely, shivering, stringhalt, roaring and whistling and the osteo-arthritic conditions, navicular disease, ringbone, spavin, etc.—has not been recognized in the past. When, however, detailed general post mortem examinations are made of horses destroyed because they are suffering from any one of these clinical conditions, excepting defective genital organs, it will be found that in addition to the local clinical condition there are numerous pathological lesions scattered throughout the body.

These lesions are of a subclinical nature, but post mortem examination reveals them often as gross lesions in joints and bones and, on microscopic examination, in peripheral nerves.

The widespread character of the lesions is associated with a disturbance of the circulatory system, active lesions showing dilatation of capillaries. Whatever causes the vaso-dilatation seems to act intermittently, as there are many signs of repair to be found, especially in joints. As much of the investigation of these conditions has been done on young horses the evidence of repair points to the disease process having been active very early in life.

In view of the general nature of the disease there is reason to doubt the importance of heredity in its causation, but until something more definite has been proved to cause the disease it would not be wise to ignore this factor altogether.

Trauma cannot be ignored, but the part it plays is probably only a secondary one in the majority of cases of rheumatic disease. Pathological lesions are found not

* Concerning trauma as a cause, Prof. W. L. Williams (1905) wrote: "Let us take the cow horse of the West, bearing a saddle of 75 pounds and a rider of 200 pounds during a long and trying day, a large part of the time at a brisk gallop, over bank and coulee, badger holes and prairie dog towns, over stones and through morass, dodging an enraged animal, darting here and there in pursuit of fleeing stock, and when the lariat is thrown, the horse must suddenly stop to bring his quarry to the ground and be keenly alert to hold it. Such animals break their legs or necks, but rarely suffer from ringbone, spavin or navicular disease. . . . On the other hand, we have seen foals less than six months of age, born in a box stall and never having been allowed the pleasure of a frolic show four large ringbones and two well-marked spavins."—Ed.

† Stewart (1866) attributed it to poor feed. James (1886) wrote: "The food is probably responsible. It is becoming rarer every year as the land is better cultivated and is not dreaded here (St. Louis) as it formerly was." Hinebaugh (1896) called it "millet-disease" and the French even earlier called it "bran disease."—Ed.

only in all parts of the skeleton but in peripheral nerves and elsewhere, and it is difficult to account for them all arising from trauma.

Bacterial and virus infections, bad housing and strongylosis are all factors which produce general disturbance of health and may thus play a part in the causation of rheumatic disease.

It is by a closer study of the methods of feeding horses that progress in diminishing the incidence of rheumatic disease is most likely to be achieved.

Already in many parts of the world the disease of osteodystrophia fibrosa of the horse, a disease which clinically has many features in common with rheumatic disease in this country, is capable of being prevented by guarding against a deficiency of calcium in the diet. Imbalance of the $CaO:P_2O_5$ ratio in the diet of the horse fed on oats, hay and bran does occur in this country, probably in an intermittent way but not in the wide disproportions met with abroad, and it may be for these reasons that the pathognomonic sign of big head is not seen. The quality of the mineral content of hay, the chief natural source of calcium supply, should be kept in mind and when clover or alfalfa hay is available this deficiency is not likely to occur. If there is reason to doubt that a sufficiency of lime is not being obtained, then this can be supplied in the form of chalk.*

The diet of the horse fed on oats and hay alone is certainly deficient in vitamins A, D and C, but the close resemblance of many of the pathological findings in rheumatic disease in the horse with those met in experimental animals fed on diets deficient only in vitamin A appears to be very significant. It is not safe, however, to take the results of experimental feeding of one species of animal and expect the same results in another.

It is only by controlled feeding experiments on horses that the question of whether vitamin A is necessary for the maintenance of health in horses can be determined, and when that comes to be done the ante-natal and early post-natal life, when growth is rapid, must be carefully watched.

With the knowledge of the wide ramifications of rheumatic disease it will be possible to interpret the results of feeding horses on deficient diets in a way one could not have done previously.

Summary

1. Investigation of the various conditions prescribed in the Regulations under the Horse Breeding Acts has shown that there is a general pathological picture common to them all, with the exception of "defective genital organs," which has not been considered.

2. The provisional name of "Rheumatic Disease" has been suggested to cover the various local conditions of the chronic generalized disease of the horse.

3. The importance of heredity in the causation of this disease is doubted.

4. Trauma is probably a secondary factor in many cases, acting upon weakened tissues, the result of defective nutrition.

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* Prof. Mitchell does not cite any observations to support this statement and it does not accord with observations of either Col. C. W. Greenlee of the U. S. Army or of Dr. Victor Buencamino of Manila. The latter routinely dispenses powdered limestone for Philippine ponies affected with osteomalacia (in the stumbling stage) and states that by using this on the feed the progress of the disease is retarded sufficiently to get about one year more service from the animal than would be obtained otherwise. The progress of the disease is not abruptly stopped as it is by changing to a ration of natural high-calcium content. This supports the theory that the disease is due to a combination of calcium-phosphorus imbalance and a vitamin A deficiency.—Ed.

McNEIL SUCCUMBS TO HEART AILMENT

John H. McNeil, Chief of the Bureau of Animal Industry of New Jersey, died in Mercy Hospital, Trenton, N. J., September 18, 1936, of a heart ailment after an illness of only two days.

Doctor McNeil was born at Bowen, Illinois, in 1870. He was graduated at the University of Pennsylvania in 1898, was appointed assistant inspector in the B. A. I., April 10, 1899 and assigned in turn to Buffalo, N. Y., Boston, Ogden, Utah and Shoshone, Idaho; resigning Sept. 12, 1900 to accept the position of professor of anatomy, surgery and obstetrics in the Veterinary Department of the Iowa State College. He was elected dean of the department in April, 1903. In September, 1908, he resigned to become professor of surgery in the veterinary division of the Ohio State University, where he remained four years, resigning to accept a position with the Brazil Land, Cattle and Packing Company. Returning to the United States in 1917, Doctor McNeil was appointed to the position he held at his death.

The deceased is survived by his widow and a brother. Burial was at Keokuk, Iowa.

INTESTINAL CALCULI IN A HORSE

A client of mine noticed that one of his horses was constipated and gave it a quart of oil. This did not relieve the condition and I was called the next day. On rectal examination I could detect a hard mass with the tip of my fingers, but was unable to reach it with my hand. The animal was not in much pain, so I administered oil and stimulants and gave repeated enemas.

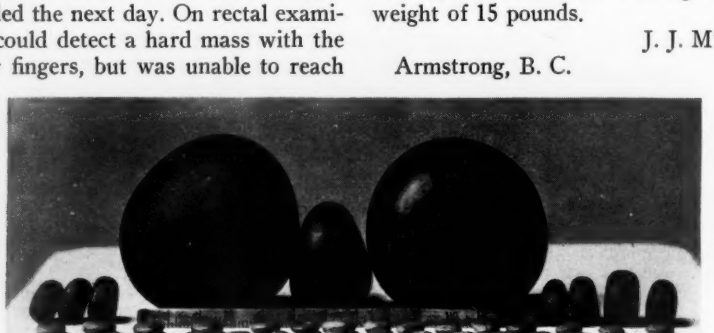
Two days later the horse had several good bowel movements. At this time I could hear the clicking of the calculi and could detect them quite easily on palpation. A few days later, the bowels became inactive and on making a rectal examination I found the smallest of three large calculi shown in the illustration had passed back to the anterior end of the rectum and lodged there. With some difficulty I was able to remove it by hand. The bowel where it had been lodged was rather inflamed, so that even after the calculus was removed the contents of the bowel would not pass freely at that point.

On account of the age of the horse, 21 years, and the size of the remaining two large calculi, the owner decided to have the animal destroyed. On autopsy the remaining calculi were removed. They were located at the right of the sternal flexure of the large colon on the floor of the abdominal cavity. The bowel was in a healthy condition considering the weight of the calculi.

On inquiry as to whether this horse had been subject to colic in past years, the owner, who had raised it, stated that it had only one attack of colic previously and that was about one year ago. The number of calculi, from the largest to the smallest, was 66. The weight of the largest was six pounds six ounces, the next six pounds three ounces, the next one pound five ounces, the remainder making up a total weight of 15 pounds.

J. J. MURISON,

Armstrong, B. C.



Intestinal Calculi from a 21-year-old horse

Pregnancy urine in doses of from 10 to 20cc administered every two or three days to four or five months old swine, was found to increase the average daily rate of gain 115 grams per day compared with the gains of a control group, according to E. P. Tschernozatonskaja. The pregnancy urine also caused permanent inhibition of sex activity.—*Exp. Sta. Rec.*

* * * *

The injection of pituitary hormones into both normal and abnormal cows and into heifer calves at the Wisconsin station resulted in the development of ripe ovarian follicles in cows two weeks after calving; in cows in various stages of pregnancy and in heifer calves three to four weeks of age. Ovulation and corpora lutea were produced in these young calves and in normal cows. Two cows that had been bred repeatedly without conceiving, conceived five days after the injection of pituitary hormones. "The results thus far lend encouragement to the hope that hormones, when properly administered, may aid in solving the problem of shy breeding."

* * * *

MEDICINE MUST GET POLITICAL

A government content to reflect public opinion results in a low state of social culture and a high one requires a highly advanced, expert, well ordered intelligence ready to lead and to submit to rational restraints and disciplines. . . . Medicine has failed to have any but a temporary, feeble effect on political theory and practice. Statesmen have seen political possibilities in some features of medical work and used them irrespective of their effect on the public development to bribe the electorate into tranquility now and good will at the future election. . . . But, this cannot be checked until medicine can control its own destiny and this cannot be acquired by mere scientific output.—*President Duhig, Medical Section, Australian Association for the Advancement of Science, in Journal of the American Medical Association.*

The last sentence is particularly significant to the veterinary profession where "scientific output" minus politics is being held out as the door to a veterinary millenium. Shades of Utopia! Scientific veterinarians are better footballs for politicians than the poorest horse doctor. The moral is to get into politics. That's where things are done.

* * * *

OBTAIN PURE EXTRACT OF SOUTH AMERICAN DRUG

American chemists have isolated in crystalline form the potent material which South American natives have long used in the rough state to combat a wide range of diseases.

This important finding of a powerful protein-cleaving enzyme which dissolves parasitic worms was announced at the sessions of the American Chemical Society by Dr. Alphonse Walti, research chemist.

The enzyme, obtained as an extract from the milky sap of the fig tree and therefore named ficin, is found to dissolve live worms in the laboratory. Ficin has been identified as the active principle of Oje, the mysterious healing agent widely used by South American natives.

"The natives regard Oje as a specific for tuberculosis, anemia, chronic stomach troubles and as a cure for ulcerous sores," said Dr. Alphonse Walti.

In 1934, Dr. Walti continued, Profs. B. H. Robbins and P. D. Lamson of Vanderbilt University showed that the milk, or latex, of the fig tree contained a similar protein-cleaving enzyme. In 1929 Dr. Fred C. Caldwell of the Rockefeller Foundation proved the efficacy of the fig tree latex against whipworm.

The experiments, wherein worms were dissolved by the crystalline enzyme, upset previously-held theories on enzyme reactions, Dr. Walti pointed out.

"It has previously been maintained," he said, "that enzymes are without effect on living cells or organisms. The dissolving of live ascaris by crystalline ficin renders this common conception invalid." — *Science News Letter,* 30:806.

Municipal Milk Inspection*

By F. B. HOLLINGSWORTH,
Ottawa, Canada

Public health protection has become so highly specialized and technical that it is treated as a separate branch of the municipal administration with its own organization and problems. Disease prevention is the guiding spirit in every branch of an efficient health department and no bureau of that organization assumes more responsibility in this direction than that having to do with the supervision of the food supply, especially milk and milk products. Safe milk is the objective desired by every well informed health official and careful observations will prove beyond any reasonable doubt that no disbursement of public funds brings greater return to the people of any community than the money expended for the promotion of health in guarding against possible contamination of the milk supply. Practically every legal requirement in the production and distribution of milk had its inception or its justification in the desire to prevent the spread of communicable disease through this medium. Even the laws, requiring certain standards for butter fat and total solids, do as much to prevent dilution with polluted water as to prohibit fraud.

The practice of scoring stables, the facilities for sterilizing milking utensils, cooling, methods of milking and handling, all go back to the well founded belief that dirty milk is unsafe milk. It is unsafe not only because it is more likely to contain whatever specific germs of disease, such as typhoid, or diphtheria, which may be present among the handlers, but because it is quite certain to contain the germs or germ products that cause diarrhea in infants and small children.

Laws have been enacted by far-sighted health officials, and trained persons laboring diligently in this field and have been instrumental in bringing the industry to its present important place in the minds of producer and distributor. There is also an ever-increasing number of consumers who appreciate changed conditions. In the old days men equipped with some, but not definite, knowledge of the requirements for pure milk were sent out to work what were then considered real hardships upon producer and dealer. Conditions found during these early inspections showed very little understanding of sanitary milk production. Stables were small, ill-ventilated, and poorly lighted. Very little milk was properly cooled, and instances are recorded where consumers demanded warm milk because they believed it freshly drawn from the cow. Raw milk was dispensed from unsterilized cans and dumped into uncovered receptacles found on door steps. Dust and dirt raised by passing vehicles added to the sediment already contained in this usually contaminated product.

Pasteurization and tuberculin testing were said to be the fancies of ultra-scientific minds and it was claimed that they would add greatly to the cost per quart. Infants often died from intestinal disorders and the cause was not then known and therefore not guarded against. Ignorance, and apathy were impediments in the way of progress, and the early inspector was sometimes considered a nuisance when he was trying to correct unsanitary conditions and when he was bringing order out of chaos by the establishment of new ideas. The people of that day, and, unfortunately some of the people of our day, detest new ideas for two reasons; first, because the new ideas compel the ossified brain to try to think and that is painful, and second, because the new idea threatens established ways and perhaps established incomes.

That the health of any community is dependent to a far greater degree, than is realized, upon the proper safe-guarding of its milk supply is evidenced by low infant mortality and reduced number of cases of contagious diseases obtained in cities where inspection, tuberculin testing, and pasteur-

* Presented at the Annual Meeting of the Central Canada Veterinary Association, Ottawa, April 7 and 8, 1936.

ization have been adopted by the health authorities. The infant death rate has decreased over 50% since milk inspection was inaugurated in our city and at a financial cost of less than one cent a year per person. Cooperating with the members of the local board of health and health officials are found progressive milk distributors who have installed, at no little expense, plant equipment, the object of which is to make milk safe and to be delivered in sterile receptacles so that it may be satisfactory to the most exacting consumer. These are noticeable points of progress which in the old days seemed impossible of accomplishment. The present time, however, finds the intelligent dealer ready and willing to adopt every preventive measure that will bring health and happiness into the home.

The producer has also observed the trend of progress in the modern stable, the clean well-lighted and ventilated stable, the prompt cooling of milk and the application of the tuberculin test. A decided improvement in sanitary methods of production have been the farmer's contribution to the programme, instituted by the health department for safe pure milk.

Meat and food inspection was commenced earlier than milk inspection and is more efficient at the present time. It is true that milk control involves unique difficulties, as milk is usually consumed 24 to 48 hours after production while meat and other foods are held for considerable periods. When meat and other foods are found unfit for consumption there is time enough to eliminate the offending lot but milk has been consumed by the time its quality has been determined.

In order to obtain the best results in the safeguarding of the milk supply of a community it is necessary that the inspector should be thoroughly qualified for such an important position; for judgment means so much to public health. We are living in an age of prevention, and also know that prevention is better than cure. Public health is purchasable, as clean milk is a necessary food, especially to children, who need it to develop bone, muscle, teeth, etc. We cannot be too careful as to its quality. Care in production is likely to be associated with increased milk consumption. By education the consumption of milk may be increased with consequent benefit to the producer.

I thoroughly believe in sanitation and it must be emphasized that there are times when common sense should prevail. We must realize that the producer is the person upon whom the public depends for foods of various kinds, we must co-operate with him. He is human, as is the inspector. Simply because an unforeseen condition occurs it does not necessarily mean that a milk shipment must stop. Good judgment must be exercised. My sympathy is with the producer but I do not allow this to detract from common sense. Just because a hurricane happens in a farmer's district and a few milk-houses are demolished in a few minutes, to have his supply cut off the next morning is ridiculous. I thoroughly believe in censuring the producer, when necessary, but we must remember the basic principle of any business is the Golden Rule.

The purpose of dairy inspection is to prevent sickness and save human lives, and by its efficiency in accomplishing these ends it must be judged. We must remember that we are not here for ourselves alone, but for others. With that ideal dairy inspection will be placed in its right category.

At a meeting of the American Public Health Association and the International Association of Dairy and Milk Inspectors in Milwaukee, Wisconsin, last fall, eloquent papers were read in regard to public health activities, especially in the food and drugs section where the ideals of milk production and consumption were emphasized. It was shown that proper methods of dairy inspection had a great deal to do with the decline of infant mortality. It was also shown that the health department must be a leader in better milk production and in the care of milk from the time it leaves the cow until it is consumed. Milk must be made safe by inspection and pasteurization. Seeds of progress must be planted in soil that has been fertilized and cultivated by medical men and veterinarians who can qualify in

such a paramount undertaking as the production of clean milk. As the children are our best future assets—the child of today is the citizen of tomorrow—all energies expended on their development are worth while and this may be aided by competent, honest, and fearless dairy inspection.

In conclusion education must go hand in hand with federal, provincial and municipal regulations in the future development of food control. As in our public schools, the old system of using the rod freely has long since given way to better methods of teaching, so will the use of drastic legal action gradually become less necessary as an enlightened food industry utilizes better methods for manufacturing, handling and preparing foods. But just as the best results are obtained in schools where some form of discipline supplements the best method of teaching, so the highest results in the production of pure food in those cases where educational methods alone are not effective will be obtained when there is available sufficient legal power and adequate machinery to administer corrective discipline.

VETERINARY PUBLICITY

The ethical serum producers announce the most comprehensive educational campaign thus far conducted on the subject of hog cholera, and the importance of having all cholera immunization carried out by veterinarians for the 1936-37 season. The new campaign will be extended to many new media of public education and will be more closely-knit and carefully followed up than any of the programs carried on by these firms in the past several years.

Advertising will be employed in major hog-producing states: radio broadcasts, over leading college and commercial stations; educational publicity, through regular news releases to over 800 newspapers; a weekly column of "Animal Health Hints" in over 400 newspapers; a special "cholera warning" service to local papers in the vicinity where outbreaks occur, and a feature service, to provide special educational publicity to the newspapers of each state through the state department of agriculture and kindred channels make up features of this program.

In its newer phases, the 1936-37 campaign follows the methods of public education which have been employed successfully by the medical profession, the meat producers, the dairy industry, and kindred groups. Besides going directly to the farmers with paid advertising messages on the subject of cholera and proper immunization by veterinarians, the campaign goes into the news columns of the daily and weekly press with timely educational publicity on the same subject. And this is further supplemented by radio.

The first general release in September called attention to the fact that this is the tenth year in the customary ten-year cycle of hog cholera's virulence, and urged farmers to take all possible precautions to avoid losses, citing the annual toll of the disease mounting to as high as sixty-million dollars in some years. The second September release cited the tremendous movement of swine from drouth areas into non-drouth regions, and the increased danger of new cholera outbreaks as a result of these movements.

Member companies of the Associated Serum Producers sponsoring this campaign are: Allied Laboratories, Inc., Blue Cross Norden Serum Co., Corn Belt Serum Co., Fort Dodge Laboratories, Inc., Grain Belt Supply Co., Jensen-Salsbery Laboratories, Inc., Liberty Laboratories, National Laboratories, Inc., Norden Laboratories, Pitman-Moore Co., Platte Valley Serum Co., Sioux City Serum Co., Sioux Falls Serum Co., The Columbus Serum Co., The Corn States Serum Co., The Gregory Laboratory, The Royal Serum Co., Southwestern Serum Co., and the United Serum Co.

The producers also have available a large quantity of free Livestock Record booklets, which veterinarians may distribute to their customers and prospects. These booklets may be obtained in quantities by veterinarians, free of charge, by writing Associated Serum Producers, 1201—Capitol Theatre Bldg., Des Moines, Iowa.

Symposium on Poultry Diseases

THE sessions of the Sixth World's Poultry Congress were organized in six sections. One section of particular interest to veterinarians was given over to discussions on sanitation and diseases; others dealt with physiology, nutrition, breeding, and similar questions. Since the value of the poultry industry in the United States is larger than that of any other live stock enterprise, it is evident that many of the discussions are of prime interest to the veterinary profession.

Among the American veterinarians attending the Congress were: Dr. J. R. Mohler, chief of the Bureau of Animal Industry, and Dr. J. R. Beach of the University of California, official delegates of the United States Government and Dr. J. E. Salsbury and Dr. Sivert Eriksen from Iowa.

The next World's Poultry Congress will be held in 1939 in the United States. It is not too early to start making plans and preparations for a representative display of the role of the American veterinarian in the control of poultry diseases and in his relationship to the American poultry industry.

Following we give, in a nutshell so to speak, the gist of the papers of general interest to the veterinary profession. For a more detailed account the official publication of the Congress should be consulted.

IN HIS address "International Efforts and Regulations of Veterinary Police in Relation to Infectious Poultry Disease," Dr. H. Berger said that the president of the *Office internationale des epizooties* was able to obtain an idea of the respective activities of 28 countries in the combating of infectious poultry diseases. Of these countries, 22 are combating the diseases with the agency of the veterinary police. In six countries, however, such is not the case. It is particularly cholera and avian pest which are being combated by legislative means. In a few countries measures are also invoked against other diseases. The measures in the various countries agree on the whole; they have as a basis the obligation to report all cases of diseases. Almost in general, the countries safeguard themselves against the introduction of infectious diseases into the country by imposing legal restrictions on the importation of poultry. Legislative regulations in respect to export are found in a few countries. Most exporting countries adjust themselves to the regulations of the importing country.

PROFESSOR H. SIMONNET (Alfort), discussing "The Importance of the Vitamins in Poultry Feeding" mentioned that vitamin supplements are not indicated in birds from which a large yield is expected, if they are closely confined and are getting highly nutritious feed consisting of concentrated fodder, which usually contains by-products. The need of vitamins is especially great during the periods of growth and egg-laying, because at such times new tissues are being formed which either use up or store vitamins. Avitaminosis in its milder forms can attack all tissues, organs, and functions. Its effects are apparent in every activity which puts any sort of strain on the organism, especially those connected with growing, and with laying eggs. They are apparent also when mistakes in feeding are made, and when infection through microbes, or disturbances through parasites are present.

DR. MANGOLD'S topic was "The utilization of feeding material." He concluded that the digestibility of foodstuffs is

* Abstract of selected papers presented at the Sixth World's Poultry Congress, Leipzig, Germany, July 24 to August 2, 1936.

dependent on numerous biological peculiarities both of the feeding materials and of the birds themselves. The same kind of corn grown in different localities often shows considerable disparities in its digestibility. Fowls show individual differentiation in their capacity for digestion.

DR. MIESSNER and Dr. R. Berge (Hanover) presented a paper on "Infectious Diseases of Hens and Their Treatment." They stated that fowl cholera may be effectively combated by active and passive immunization. Tuberculosis amongst poultry is most successfully combated by reducing the age of utilization, controlling nests in which eggs are laid, elimination of bad layers and common sense hygienic management. Prophylactic vaccination in connection with hygienic precautions may reasonably be regarded as promising most success in the treatment of fowl pox. The inoculation should be carried out yearly when the young birds are about three months of age. Intracloacal inoculation with vaccine would seem to be the most suitable method for combating laryngotracheitis. The cause of the infectious form of catarrh has not yet been sufficiently investigated to enable suitable methods of control to be determined. Suitable breeding in clean, well ventilated houses, free from draughts, combined with the hardening of the chickens, provides the best form of prevention known at present. Pullorum disease is best controlled by eliminating carriers by conducting blood tests regularly, and by hygienic precautions. It is most important that the greatest attention should be devoted to disease resistant strains. Recent researches on leucosis have shown that this disease can be considered as parallel with tumors. The view is held that the exciting agent may be a substance of the nature of an enzyme, which is produced by the proliferation of leucosis cells. Poultry paralysis has recently been attributed to leucosis. It is assumed that an irritation of the lymphatic cell apparatus takes place, the results being the infiltration of the nerves with lymphocytes. Hygienic precautions should be taken against paralysis in poultry.

DR. J. R. BEACH (Berkeley) lectured on "Virus Diseases of Chickens." In his summary he stated that epidemic tremor, a new virus disease of chicks, is characterized by tremor of the head and neck, and an ataxia. The disease has been encountered in the United States; it must be differentiated from tremor of hereditary origin, which has also been seen. Fowl pox vaccine prepared from unmodified chicken virus is used almost exclusively, because a number of investigators in this country have found that pigeon-virus vaccine does not provide an adequate protection against natural infection with chicken virus. Concerning the practice of fowl pox vaccination in day old chicks he said that more experimental studies are needed before it can be recommended. The occurrence of infectious laryngotracheitis can no longer be regarded as confined to North America, as formerly supposed. A respiratory disease of chicks, clinically similar to infectious laryngotracheitis is said to be caused by a virus distinct from that of infectious laryngotracheitis.

"THE Significance of Poultry Diseases in the Control of Food-Stuffs" was the theme of Doctor Beller's address. He concluded that the object of veterinary food control is to obviate the injurious effect on human health, allegedly due to eating the eggs and flesh of poultry. By the elimination of sources of infection this control serves the interests not only of consumers of poultry and poultry products but of poultry breeders as well.

DISCUSSING the "Influence of the Ecological Conditions upon Italian Poultry Keeping," A. Vecchi said: The higher degree of humidity together with the low temperature during winter months are factors contributing to the decline of laying during those months. Damp cold is the greatest enemy of fowls, and its influence is felt not only in the egg production, but also in the health of the birds.

J. BIELY and coworkers stressed "Pilchard Oil as a Source of Vitamin A and D for Poultry." They explained in their paper that pilchard oil is obtained from the pilchard fish, caught off the west coast of British Columbia. The pilchard, in an earlier stage of its migration is also caught off the California coast, and is known there as the "sardine." Practical feeding tests confirm the experimental conclusions that pilchard oil is a rich and economical source of vitamin A. Biological tests have also shown that pilchard oil is a very potent source of vitamin D. It is recommended that for growing chicks pilchard oil should be fed at the level of 0.5% and for laying hens at the level of 1% of the total ration. The data show that for poultry feeding the vitamin A content of pilchard oil equals that of cod liver oil.

DR. F. BILEK presented a paper entitled: "Experimental Changes of the Pigments in the Yolk with Reference to the Contents of Vitamins." He states that biological experiments prove clearly that the content of vitamin A increases and decreases as the content of pigments in the yolk increases or decreases. The color of the yolk, therefore, is not indifferent. As the content of cholesterol increases with the increase in pigment, the content of the vitamin D, which depends on the cholesterol, is, in all probability, also influenced.

DE BOCARME declared in his contribution "Influence of Natural Instincts upon the Devouring of Substances Other Than Feed" that insects, milk, and other substances furnish the necessary mineral salts. The feed usually given does not satisfy all the demands of the animal's organism, but if a complete adequate feed mixture be used, the animals would automatically cease to consume such substances as leaves, wood-slivers, and similar foreign bodies.

DR. V. VEZZANI and coworkers reported on "The Production of Eggs Impregnated with Iodine and Their Uses in the Treatment of Children's Ailments." The result of the treatment, which was studied also with respect to increasing the physical power of resistance against infection, demonstrated that eggs containing iodine had a beneficial effect on the general health of the children, as they tended to increase the weight, to improve the purity of the blood as well as to increase the powers of resistance against disease. The efficacy of the treatment, however, was not dependent on the actual quantity of iodine taken, as very good results were obtained where the quantity of iodine was comparatively minute.

E. ROBERTS and L. E. Card (Urbana) reported on the "Inheritance of Resistance to Bacterial Infection: A Genetic Study of the Pullorum Disease." Selection was effective in producing strains of the domestic fowl more resistant than unselected stock in respect to infection by *Salmonella pullorum*. The selected stocks were consistent in maintaining resistance through successive generations. Resistance is dominant to susceptibility, but probably more than one gene is involved. (See VETERINARY MEDICINE, 31:2, Feb., 1936, pp. 76-77.)

DR. S. AYGUN told of "The Occurrence of Poultry Enteritis in Turkey": Of 89 geese examined, four proved to be infected with *Salmonella enteritidis*. Of 286 ducks examined, 14 reacted positively to *S. enteritidis* antigen. Of 61 pigeons examined, four showed *S. enteritidis infection*.

BARATTE'S subject was "Observation Concerning the Advisability and Possibility of Isolation Methods in Poultry Raising as Aiding in the Prevention of the Spread of Contagious Diseases." He reflected

that the larger the number of animals living together, the more necessary is their isolation for the successful combating of contagious diseases. The breeder can best effect this isolation by the use of separate cages or coops.

DR. R. BAUMANN read a paper "Researches on Etiology and Occurrence of Paralysis in Poultry in Austria." He proved that Marek's paralysis can be transferred to fowls experimentally. Chickens, three to four weeks of age, have developed subdural and intramuscular infection without exception; at three months of age, only partially. The infection of a hen, about 12 months old, has been found possible. Nerve material, passed through Berkefeld filters, was infective. Incubation varied, with artificial infection, between five weeks and four months.

C. A. BOTTORFF and collaborators presented a paper on "Epidemic Tremors (Trembling Chick Disease)." They stated the epidemic tremor is a disease causing a permanent injury to the nervous system. The severity of the injury and the part of the nervous system affected determines the condition of the individual. The affected chicks may show a distinct and rapid tremor of the head, neck, and in some cases the tail, and in the majority of cases an ataxia. The mortality varies from practically nothing to 65%. From the transmission studies conducted, no evidence was indicated as to how the disease was spread. The results of all breeding studies indicate that this disease is not hereditary. The studies of the affected birds showed no significant differences in body temperatures or blood counts. All attempts at the treatment of this disease proved to be valueless.

J. T. BURRISS and E. W. Roberts (Wooster) reported their studies on "Livability Results in Chicks from Flocks Tested for Pullorum Disease by the Standard Tube Agglutination Method." The total three-week mortality for the past three seasons in the breeder farm hatcheries was 3.5% of which 0.6% could be attributed to mechanical causes, leaving 2.6% mortality considered as loss due to unknown or undetermined causes. In the commercial hatcheries group, the total three-week mortality was 2.6% of which 0.2% could be attributed to mechanical causes, leaving 2.4% due to unknown or undetermined causes. Of the broods and chicks reported during the past three seasons, in the group of breeder farm hatcheries, the mortality in 82.3% of the broods and 86.1% of the chicks was less than 5% the first three weeks with an average mortality of 2.3%. Over 5% losses were revealed in 17.6% of the broods and in 13.8% of the chicks, with an average three-week mortality of 9.6%. In 879 broods and 239,254 chicks reported the past three seasons, in the group of the commercial hatcheries, 89.5% of the broods and 89.1% of the chicks demonstrated losses of less than 5% with an average mortality of 1.9%. Losses over 5% were found in 10.4% of the broods and in 10.8% of the chicks; the average mortality was 7.8% for the first three weeks of brooding.

T. DALLING and G. H. Warrack, contributing their "Observations on Fowl Paralysis (Lymphomatosis)," said that lesions of lymphomatosis may be found in practically all tissues, including those of the nervous system. Lesions may occur only in the nervous tissue or in other tissues, or in both, in the same bird. Clinical and histological evidence of lymphomatosis may be found in fowls at ages varying from 2 to over 27 months. In the older affected birds, there is evidence that the condition did not occur at an earlier age. There is some evidence that the injection of tissues from affected birds into healthy normal stock may play a part in transmitting lymphomatosis. In some birds the injection of tissues from healthy birds seems to be followed by the occurrence of lymphomatosis. There is no evidence that lymphomatosis is transmitted by contact of potentially affected adults with healthy young chicks. (VETERINARY MEDICINE, 30:2, Feb., 1935, pp. 68-70; 30:9 Sept., 1935, p. 389; 31:1, Jan., 1936, p. 35.)

IN HIS paper "Marek's Chick Paralysis (Neurolymphomatosis)" Dr. J. Dobberstein brought out that Marek's chicken paralysis bears in its whole general character a great resemblance to the contagious tumors and leucosis, prevalent among poultry. The pathology at the basis of this disease has apparently no connection with true neuritis or encephalomyelitis but rather is primarily a malignant growth in the nerve centers, leading finally to partial or total necrosis of such nerve centers. Marek's chicken paralysis, therefore, has many points of similarity with neurofibromatosis as it is found in cattle.

RELATING his "Practical Experiences in Combating Chicken Paralysis" Doctor Fritzsche mentioned that birds which are suspected of having neurolymphomatosis gallinarum must be carefully weeded out, and in this way only can the flocks be preserved from contagion. A thorough system of manure and excrement removal as well as disinfection (VETERINARY MEDICINE, 31:9, Sept., 1936, pp. 386-9), should be among the measures to be taken. In order to avoid what is otherwise an annually recurring infection of the young chickens, the new broods should be segregated on land some distance away. If there is a limitation of space it is advisable to interrupt breeding for an entire year; then, purchase fifteen-week-old chicks from healthy surroundings.

COMMENTING on "The Importance of Paralysis and Leucosis in Poultry Raising" Dr. L. Geurden is of the opinion that under the influence of certain non-specific substances, certain definite pathological changes may be noticed in poultry, which have their origin in the previous condition. This is the toxic phase. When this phase has lasted a certain length of time, the hemocytoblastosis becomes immune to toxic influences, and this is then the neo-plastic phase. The possibility of being able to transmit the disease experimentally can be explained by the superficial inoculation of the neo-plastic cells, which will propagate themselves in the new organism, or by the transmission of an enzyme causing neoplastic reactions, and later neo-plastic cells. Already known causes, such as parasites, chicken infections, and excessive exploiting of poultry must be energetically combated. Poultry units in which there is a tendency to susceptibility to this disease, should never be used for breeding purposes.

E. A. GUITTIEREZ reported on "Treatment of Contagious Pip in Fowls with Argyrol." He said a solution of argyrol, rightly used, may produce a complete recovery of the birds within three to five days.

DR. HARNACK presented: "Poultry Tuberculosis, its Prophylaxis and B.C.G. Experiments for Rendering Poultry and Pigeons Immune." He stated that in order to guard poultry against tuberculosis, the same preventive measures and precautions are required as with human beings or with cattle. By being able to determine tuberculous subjects in due time with the help of the tuberculin test, the infected animals may be isolated. Complete disinfection should be carried out. This will serve to hinder the spread of the disease.

THE Importance of Veterinary Sanitary Control of Poultry Breeding Establishments for Combating the most Important Diseases" was discussed by Dr. H. Hartwick. He maintained that practical experience with a regular control of health conditions has shown that by eliminating all birds the blood of which was positive from those used for breeding purposes, eight flocks were freed from pullorum infection within three years. In combating neurolymphomatosis and leucosis, good results may reasonably be expected from veterinary sanitary control, when latent diseases come to light as a result of frequent clinical examinations. The sanitary supervision of flocks enables combative measures to be undertaken without delay and will thus result in a decrease in the occurrence of those diseases which are otherwise of frequent incidence, for instance fowl pox, infectious catarrh, coccidiosis and tuberculosis.

DR. TE HENNEPE spoke on "Observations on Combating Diseases of Poultry in Holland." According to this paper the three main causes of the increasing lack of vitality in hens are: (1) breeding during the first laying period, (2) insufficient knowledge of the proper food for highly productive birds, especially as regards vitamins and minerals, and (3) the artificial methods, unavoidable in poultry breeding.

"THE Occurrence of Harmful Bacteria in Foodstuffs Caused by Poultry and Poultry Products" was the title of a paper read by Doctor Lerche. It is his observation that latent infection, caused by the Salmonella group, is not infrequent among waterfowl. Under favorable conditions such as high temperatures, humidity of the atmosphere, conservation in lime water, etc., Salmonella bacteria are able to penetrate into the interior of the egg. Fresh albumen tends to destroy these bacteria, whereas the yolk promotes their growth. In order to cause the bacterial poisoning of food containing duck eggs, the quantity of bacteria must be large. To avoid infection, it is not sufficient to issue warnings against the eating of raw duck eggs. Either the sale of duck eggs must be entirely prohibited or else these eggs must be made innocuous by means of a thorough system of blood and excrement test. The combating of Salmonella infection among water fowl and pigeons seems highly advisable as a preventive of possible infection of the larger animals used for food and a consequent danger of epidemics from poisonous meat.

"PARATYPHOID of Pigeons" was the subject of Prof. G. Lesbouyries' (Alfort) address. He pointed out that the less known symptoms of paratyphoid in pigeons are leg weakness, limping and cramp; they are not caused by arthritis, but by a functional impotence of the muscles, especially by the pectoral muscles. Typical lesions are sero-fibrinous pericarditis and nodular pancreatitis. Vaccination with heated cultures frequently causes a subsidence of the early lesions of arthritis and myositis.

C. A. McGAUGHY, in his paper "Recent Advances in Research on Poultry Diseases," pointed out that non-infectious diseases appear to be more prevalent and more serious than infectious diseases. Further research is necessary on the effect of vegetable poison on young chicks and on adult birds.

"NEW Experiences with Fowl Cholera" were related by R. Manninger, (Budapest). Fowl cholera, he stated, is not a contagious disease in the usual sense of the term. Where poultry are kept under satisfactory conditions fowl cholera will either not occur at all, or will occur only sporadically, or it may assume less dangerous forms, for instance pharyngorhinitis, "lobule disease" (Läppchenkrankheit), and wattle disease. An outbreak of fowl cholera can be prevented by the practice of hygiene. The separation of the healthy birds from the sick and the adoption of other hygienic measures are important in so far as they lessen the possibility of infection and prevent the susceptible from falling sick, even if their power of resistance cannot be brought up to normal level. Vaccines should not be used generally.

"LACK of Vitamins and Infections. A Disease of Ducks with Symptoms of both Conditions" was the title of the paper read by C. A. Martin and R. C. Onetti. These authors are of the opinion that the ducks in question were suffering mainly from a lack of various vitamins (avitaminosis mixta). Treatment with vitamin A and B proved successful. From the dead bodies of the ducks, incubated eggs, and fresh eggs, *Salmonella suipestifer* were isolated and inoculated successfully into healthy birds of another farm. Agglutinins were produced and the serum attained a titer varying between dilutions of 1 : 200 and 1 : 2000. The vaccinated ducks suffered merely from diarrhea during the first few days after the infection and soon recovered. *Escherichia coli,* isolated from the same ex-

perimental animals which had been inoculated under the same conditions had no immunizing effect. The vaccinated animals merely suffered mildly from diarrhea. The disease due to lack of vitamins was increased only in a secondary form by the presence of *S. suipestifer,* and perhaps to a lesser degree by that of *Escherichia coli.*

C. A. Y. MARTIN delivered a paper on "The Infectious Laryngotracheal Bronchitis of Fowls in Spain." He observed that the virus producing the infectious laryngotracheal bronchitis in fowls is not exclusively to be found in the respiratory organs; it exists also in some organs in the abdominal cavity and especially in the mucous membrane of the duodenum. With emulsions of this organ the typical disease can be produced artificially in healthy animals. The disease occurs in three forms of which two show their symptoms in the respiratory and the digestive organ, while the third is a mixed form. The three forms of the disease can be produced with parts taken from the respiratory and digestive organs and especially with parts from the mucous membrane of the duodenum. The virus is also found on parasites (mites) which live on the skin of the diseased animals and which, if transferred to healthy animals, infect them with the disease. The infection may be produced by experiment in the respiratory tract, the digestive tract, subcutaneously and by cutaneous inoculation. The gravest form of the disease and more frequently terminating in death than the other forms is that which attacks the digestive organs. Young birds are more susceptible and cases of death resulting from the disease are more numerous than in adult birds. Cases of infection and cases of death as a consequence of the infection are more numerous in high-bred fowls, especially in Leghorns, than in common breeds. Fowls which have suffered from other maladies, especially from avitaminosis show the greatest percentages of infection and mortality. Other predisposing causes are insufficient and improper feeding, the presence of epiphytic and endophytic parasites. Fowls which have recovered from the disease acquire immunity. The author concludes that the term laryngotracheal bronchitis is not quite adequate, because neither the virus nor the functional derangements and anatomical lesions are confined to the respiratory organs.

IN HIS "Studies of Perosis in Chicks" H. J. Milne found that in rations otherwise satisfactory for normal growth, a high level of phosphorus was found to be associated with a high incidence of perosis. Rice bran, when comprising 20% of a high phosphorus ration was effective in reducing the incidence and the severity of the condition.

N. NAKAMURA gave "A Few Experimental Hints on Vaccination against Laryngotracheitis." He said that the serum taken from the birds which have received the subcutaneous inoculation of the virus possess a higher viricidal property, neutralizing the virus, than the other sera. Therefore, it seemed likely that the fowls to be exposed to the infection (in the stationary field) of this disease would be protected actively by previous, subcutaneous injection of the virus.

A. SCACCINI mentioned "The Effects on Poultry of Certain Substances Commonly Employed for the Therapeutic or Prophylactic Purposes or Used in Agriculture for the Combating of Injurious Insects." These are the findings: The minimum fatal dose of mercury bichloride in the course of a month is 10cc of a 1% solution every two days; as a maximum dose given continuously, 10cc in a 0.5% solution every two days is tolerated. The minimum fatal dose of sodium arsenate in the course of a month is 10cc in a 0.25% solution (equivalent to .015 grains of arsenic) every two days; as maximum dose given continuously, 10cc in a 0.1% solution (equal to .006 grains of arsenic) every two days is tolerated. All solutions of copper sulfate of 1% or over, in quantities of 10cc given every other day, are fatal; as maximum dose given for a long period of time, 10cc in a 0.5% solution every two days can be

withstood. The minimum fatal dose of iron sulphate during the course of about a month is 10cc of 5% solution every two days; as maximum dose given continuously, 10cc in a solution of 1% to 2% every two days can be taken without harm. Salicylic acid can be given safely in a saturated solution of water continuously in quantities of from 5 to 10 grains daily. Symptoms of disturbance become apparent, but are not mortal.

"ENTERITIS Infection in Fowls (Paratyphosis, Salmonellosis)" was elucidated by Dr. J. Schaaf, (Giessen). Infectious enteritis is a widely spread, economically important disease of ducks, pigeons, geese and other poultry, similar to chicken dysentery. The disease is chiefly incidental to breeding. It is caused by Salmonella bacteria which can bring about food poisoning in man by means of infected eggs, (especially duck's eggs) and infected flesh.

"POULTRY Paralysis and Diseases due to Improper Feeding" was the theme presented by Dr. O. Seifried, (Munich). The general term "poultry paralysis" may be divided into two separate and independent groups, namely those of an infectious nature and those which are caused by improper nutrition. To the first of these groups belong Marek's poultry paralysis with its various forms, New Castle disease, Korea or chicken plague, and epidemic tremor. The second group includes the B_1 and A avitaminosis, the paralysis caused by too much albuminous food, encephalitis due to improper feeding, muscular dystrophy and shrivelled claws due to improper feeding. The diseases in the first group cause inflammation primarily, while those of the second group cause degeneration of the nerve centers and of the muscular system.

C. SPREHN and U. Maskar spoke on "Brachylaemi as the Cause of Hemorrhagic Appendicitis among Poultry." Their findings confirm in large measure the opinion of Dollfus (1935) that all poultry brachylaemi in the palearctic zone belong to the category *Brachylaemus commutatus*. For the present we have to distinguish three varieties within this category: *Brachylaemus commutatus commutatus Brachylaemus commutatus gallinus* and *Brachylaemus commutatus annamensis*.

"THE Importance of Bacillemia Occuring with Tuberculosis of Chickens" was stressed by C. V. Tomescu. Investigations of bacillemia associated with natural tuberculosis of pigeons and with experimental tuberculosis of chickens lead to the conclusion that contrary to previous investigators, bacillemia occurs rather frequently and that it is not closely related to the particular form of the disease but is dependent on the stage of the infection.

IN HIS "Notes on Poultry Tuberculosis in Lombardy," Dr. G. Vianello calls attention to the necessity of subjecting all imported poultry to a thorough tuberculosis examination at the frontier.

"INVESTIGATION of the Intermediate Host of the Poultry Tapeworm as Found in Germany" is a study contributed by Dr. R. Wetzel. *Raillietina cesticillus* has 13 different kinds of crawling beetles as carriers. Corresponding to the biological habits of the beetles, this form of worm is mostly to be found in poultry kept on dry, sandy soils. The intermediate host for *Davainea proglottina* are nine different species of naked and shelled snails. For this reason *D. proglottina* infections are most apt to occur in chickens kept on damp and shady land. For the *Choanotaenia infundibulum*, in addition to the house fly and certain kinds of manure beetles, the Carabidae are the most common hosts. *Hymenolepis carioca* is carried by manure beetles, *Aphodius fimetarius* and the Geotrupes species. The earthworm has been found to be the intermediate host for *Amoebotaenia sphaenoides*.

WITH regard to "The immunogenetic value of the cultural forms of *Pasteurella avicida*" Wynohradnyk maintains that the vaccination with the living culture of *P. avicida* of the blue form gives better results than the vaccination with the dead cultures.

Disinfection of Kennels

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PREVIOUSLY reported data[1], which demonstrated the practicability of disinfecting limited areas of contaminated ground by the application of sufficient amounts of moderately dilute solutions of household lye to saturate the surface of the soil, led to studies of related problems of animal hygiene.

In areas where large numbers of hunting dogs have been maintained in the same kennels for a period of years, hook worm infestation has become a serious problem. Removing the adult worms from the intestinal tract by the administration of appropriate anthelmintics provides only temporary relief unless reinfestation is prevented. This problem had become so acute at the Old Radnor Hunt Club, near Philadelphia, that the abandonment of the kennel was contemplated. Fecal examination of the dogs revealed a very heavy degree of infestation. The number of infestative larvae in and on the soil was estimated by placing samples of the soil in beakers, moistening slightly and packing, and then placing a number of toothpicks vertically in the soil. This was then covered by a smaller beaker to prevent evaporation and to allow a film of moisture to remain on the surface of the toothpicks. At the end of seven days, the toothpicks were removed and the upper ends washed in a drop of water on a microscopic slide. This was immediately examined for the presence of larvae. With untreated soil from the runs, each toothpick yielded from 4 to 33 larvae, the average being from 8 to 15.

Studies with the infective larvae from untreated soil, which were obtained in the manner described or from washing the inner surface of the smaller beaker which had been inverted over the contaminated soil, showed the larvae to be extremely sensitive to the action of dilute solutions of sodium hydroxide. Concentrations as low as 1:500 caused momentary irritation and increased activity, which was followed by death within a minute.

Tests were made, therefore, with mixtures of heavily contaminated soil from the Old Radnor Hunt Club and sodium hydroxide solutions of various concentrations. As in the experimental work reported in the previous paper, trinitrobenzene was used to indicate the degree of alkalinity obtained. At pH 12 or above, this indicator is reddish-orange; at pH 11.5 or below, it is colorless.

THE DESTRUCTION OF HOOKWORM LARVAE WITH SODIUM HYDROXIDE

Mixture of Soil and Lye Solution	Reaction of Trinitro-benzene	Number of Larvae on Toothpick
Control 500 grams Soil 100 cc. Water	Colorless	18
500 grams Soil 100 cc. 5% Lye	Orange-Red	0
500 grams Soil 100 cc. 2% Lye	Orange-Red	0
500 grams Soil 200 cc. 2% Lye	Orange-Red	0
500 grams Soil 100 cc. 1% Lye	Slight-Orange	1 barely motile
500 grams Soil 100 cc. 0.5% Lye	Colorless	3

THE life history of the hook worm made it apparent that the application of sufficient sodium hydroxide solution to contaminated areas to alkalinize the surface to pH 12 or above would prove effective in destroying the majority of these parasites.

In the first or rhabditiform stage, the larvae feed and usually remain in close proximity to their food, which is the feces of their host or other decaying organic matter. When they develop into the filariform or infestive stage they no longer feed, but expend their energy in ascending as high as the necessary moisture film will permit. Under field conditions, the larvae

migrate to the very tops of soil particles where they distend themselves either singly or in polyp-like masses awaiting contact with their host[2].

In case no host comes into contact, the length of life is determined by the amount of food which remains in the body, providing other factors remain favorable. In water and under laboratory conditions, they have been maintained for as long as eighteen months[3], although in the soil under field conditions the rains and droughts, fungi, bacteria and protozoa would tend to lessen this period materially. However, the viability of these larvae is such that attainable periods of idleness, such as would result from the alternate use of two yards, would not insure their destruction.

AT the beginning of the field tests, tetrachlorethylene was administered to the dogs and they were placed upon cement floors for two days while the dirt runs were being treated. The surface of the soil was saturated with a two percent solution of household lye. In this test sixty gallons proved sufficient to treat an area 20 by 30 feet. An hour after the application of the lye, the surface of the soil continued to maintain a degree of alkalinity greater than pH 12. Samples of soil from areas known to be heavily contaminated were placed in beakers and tested for the presence of viable larvae by the technic previously described. None was found.

Two hours after the application of the lye solution to the soil, the dogs were returned. Their feet showed no evidence of irritation.

WHILE it cannot be expected that one treatment will be sufficient to eliminate all hook worm infestation from a kennel because (a) the anthelmintics now available are not one hundred percent effective in removing the adults from the intestinal tracts of dogs, (b) some of the larvae recently acquired may not have reached the intestinal tract at the time of treatment, and (c) it is probable that some of the larvae in the soil will not be reached by the lye solution as it is applied under field conditions; yet this method may offer a means of ridding a kennel of hook worm infestation without undue cost and within a few months' time.

References

1. McCulloch, Ernest C. The Disinfection of Poultry Yards; *Veterinary Medicine,* 31:8, (1936).
2. Hegner, Robert; Root, Francis M.; and Augustine, Donald L. Animal Parasitology; The Century Company, New York, (1924).
3. Ackert, J. E. Notes on the Longevity and Infectivity of Hookworm Larvae; *American Journal Hygiene,* 4:222, (1924).

POPULAR MISCONCEPTIONS

1. A pure-bred female bred to a scrub male will never subsequently produce pure-bred offspring.
2. Intestinal worms always cause a noticeable increase in the appetite of the host.
3. Gritting the teeth while sleeping, in a child, always indicates intestinal worms.
4. When a pregnant female is frightened or profoundly affected by an unusual sight, the appearance of the offspring may be affected.
5. Slitting the skin and putting salt in the wound prevents various infectious diseases, particularly blackleg.
6. Eggs with a relatively high specific gravity are fertile.
7. Short periods of cooling are beneficial to incubating hen eggs.
8. Long, narrow hen eggs produce roosters.
9. The temperature of a broody hen is much higher than that of a laying hen.
10. Underground crops (e. g., potatoes) should be planted during the dark of the moon; above ground (e. g., corn), during the light phase.
11. Feeding garlic cures gapeworms in poultry.
12. A horse may "pull himself blind."
13. Watering a horse immediately after he has eaten washes most of the feed out of the stomach.
14. Excising the third eyelid relieves tetanus in horses.
15. Some persons can stop hemorrhage by pronouncing certain "magic words."
16. Operations should be performed only when the sign of the zodiac is right for the part operated upon.
17. "Horn flies" may eat their way into the horn core.
18. Cats born in the fall shed hair continuously.
19. Animals weigh more dead than when they are alive.
20. It requires a bushel of corn to "fatten" a pig's tail.
21. Fits in dogs are caused by worms in their tails; rabies by a worm in the tongue.
22. Running a hot iron through a fold of the skin cures distemper in dogs.
23. Dogs are more susceptible to rabies during "dog days" than during the remainder of the year.

WESLEY O. KEEFER.
Columbus, Ohio.

Abstracts

USE OF LENTIN IN RETAINED SECUNDINES

The drug Lentin (Merck) possesses an accelerating and recuperating action upon the bovine uterus, which makes the use of this preparation desirable in the treatment of retained afterbirth.[117] The extradural application of 3cc to 4cc avoids most of the danger incidental to subcutaneous use.

TREATMENT FOR SYNGAMIASIS

An efficient vermicide[118] against *Syngamus trachea* was found in the use of garlic oil or the allyl sulfide. The drug is to be diluted with two parts of linseed oil. Of this mixture, one to two drops are given thrice daily. This drug possesses also a sterilizing action upon the eggs present in the pregnant female, thus preventing infestation of other chickens from this source. The advent of the hatchery and brooder house have nearly eliminated the gape worm.

AN IMPROVED STOMACH TUBE

Hagenthau[119] summarizes the advantages of a stomach tube, the head of which is bulbous shaped, as follows: The tube is passed with ease, because the horse is able to swallow. When the tube has entered the pharynx, a teasing movement of the tube is felt; this indicates the moment when the tube is ready to be pushed down the esophagus. The correct location of the tube is further indicated by the increase in resistance to suction. The downward movement of the tube is quite visible in the jugular groove. The bulbous-shaped end of the tube may be palpated easily at any time.

[117] Benesch, F., and K. Steinmetzer, 1936. Über die Registrierung der Uteruskontraktionen beim lebenden Rind nach Lentinwirkung; (The Influence of Lentin "Merck" upon the Contractability of the Uterus); *Wien Tierärztl. Monatsschr.*, 23:8, pp. 225-31..

[118] Clapham, Ph. A., 1935. Treatment of Syngamosis; *Jour. Helminth.*, 13:1, pp. 3-8.

[119] Hagenthau, 1936. Versuche mit einer Nasenschlundsonde mit Knopf; (Experiments with a Stomach Tube Having a Bulbous Shaped Head); *Zeitschr. f. Veterinärk.*, 48;6, pp. 261-68.

TREATMENT FOR SATYRIASIS AND NYMPHOMANIA IN HORSES

Epiphysan (manufactured by the firm G. Richter) has proved to be of great value in interrupting or combating hypersexuality in horses, especially in racing horses.[120] In addition to its inhibiting action upon libido, it possesses also a favorable action upon the appetite; thus it influences favorably the condition of the horses under treatment. Depending on the degree of exalted sexual desire, the subcutaneous dose is from 5cc to 10cc. The inhibiting action lasts from one to three days and even longer.

LESIONS OF HOG CHOLERA

The results of the latest comparative investigations[121] indicate that the blood vessel lesions and the lymphnode lesions and the encephalomyelitis, observed in acute and chronic cases of hog cholera, lack diagnostic specificity, because they occur in several other diseases of hogs.

CIRCULATORY DISTURBANCES IN COLIC

Discussing the relationship between blood circulation and colic, Steinhart[122] concludes that the activity of the intestines may be influenced favorably in all forms of colic by the way of the blood circulation. Many intestinal disturbances can be combated by raising the blood pressure; some necessitate adstringent action upon the blood vessels. Early application of drugs is all important. Quick action is often desirable. Regardless of the therapeutic action upon the circulatory system, treatment of the intestinal tract must not be neglected in many forms of colic.

[120] Hutschenreiter, C., 1936. Das Epiphysan (G. Richter) in der Hypersexualitätibekämpfung beim Pferde; (The Treatment of Hypersexuality in Horses with Epiphysan); *Wien. Tierärztl. Monatsschr.*, 23:8, pp. 231-37.

[121] Seifried, O., 1936. Neuere Forschungsergelenisse auf dem Gebiete der Histopathologie, Pathogenesis und Diagnostik der Schweinepest; (Newer Investigations on Hog Cholera); *Tierärztl. Rundsch.*, 42:23, pp. 441-44.

[122] Steinhart, 1936. Kreislauf und Kolik; (Colic and Blood Circulation); *Zeitschr. f. Veterinärk.*, 48:6, pp. 241-61.

INTERACTION OF VITAMINS

The vitamins exert a certain antagonism upon each other similar to that observed among hormones.[123] Experiments have demonstrated that the symptoms of a fatal hypervitaminosis A can be allayed by the administration of preparations containing the vitamin B complex; further addition of vitamin C to the diet will bring about a complete cure. Similarly, vitamin B will allay the symptoms of a hypervitaminosis D. On the other hand, the symptoms of hypervitaminosis B could be aggravated by the addition of vitamin A; but the addition of vitamin C sufficed to allay the symptoms of hypervitaminosis A. The action of vitamins is influenced also by the mineral metabolism. There exists also antagonistic relations between vitamins and hormones.

MAMMARY ACTINOMYCOSIS

True mammary actinomycosis has never been observed,[125] that is to say, a real *Actinomyces bovis* infection. Various authors, however, have cited cases of actinomycosis due to staphylococci. In a study of 117 cases, Albiston and Pullar (1934) found 115 attributable to staphylococci, one to an actinobacillus and another to an unidentified streptotrix.

The author describes a case of mammary actinomysosis as follows: On section, numerous small nodules were seen in bold relief, each enclosed in fibrous tissue. In substance, the nodules were spongy; the inter-nodular spaces filled with yellow granules, the staining of which revealed gram-positive cocci. Culturing in aerobic and anerobic media gave *S. pyogenes* in pure culture. Histologically examined, the mammary structure revealed that it was formed of fibrous tissue, fibroblasts, a zone of leucocytes and numerous central colonies surrounded by a palasade of massive acidophiles. The general structure was truly actinomycotic but cocci replaced the filiments of *Actinomycosis bovis*. The integer recalls equine botryomycosis. The name "actinomycosis" is not correct. The name "actinococcosis" is proposed.

TREATMENT FOR SWAMP FEVER

The favorable results obtained from potassium permanganate in human cases of pernicious anemia induced Sundberg to experiment with the drug in horses.[124] A three-year-old gelding suffering from a severe form of swamp fever, which was pronounced incurable, was given four grams of potassium permanganate in 400 grams of water intravenously. The patient recovered. The author considers the action of the drug due to its disinfecting properties and the blood forming action of the manganese component. Equally favorable results were obtained in a number of other cases. Fatalities occurred then only when the number of erythrocytes had fallen to less than three million.

CALCIUM BOROGLUCONATE THERAPY

Calcium borogluconate[128] is a solution of calcium gluconate in boric acid, according to the following formula:

Calcium gluconate	60gm
Boric Acid	12gm
Water	350cc

If a few drops of an alcoholic thymol solution are added, the solution will keep for a long time. The solution is given either subcutaneously or intravenously. Best results are obtained when both methods are applied simultaneously. Sheep with puerperal paresis, are given 25cc intravenously and 75cc subcutaneously of a 20% dilution.

This treatment is very effective in cattle in all those cases in which the calcium therapy is indicated. The dose is 150cc intravenously and 200cc subcutaneously.

Similar favorable results are obtained in puerperal eclampsia of sows and bitches.

[123] Stepp, W., and H. Schröder, 1936. Über den Antagonismus der Vitamine und seine Bedeutung für die Vitamintherapie; (The Antagonism of Vitamins and Its Importance in the Vitamin Therapy); *Klin. Wchnschr.*, 15:16, pp. 548-50.

[125] Davis, G. O., 1935. Mammary Actinomycosis; *The Veterinary Record*, Jan. 5, 1935; Abstracted in *Recueil de Med. Vét.*, 111:3, March, 1935.

[124] Sundberg, R., 1936. Perniciös anämi hos häst; (Swamp Fever in Horses); *Svensk Vet. Tidskr.*, 41:1, pp. 16-21.

[128] Thorshaug, K., 1935. Therapeutic Effect of Calciumborogluconate, (Trans. title); *Norsk Vet. Tidokr.*, 47:12. pp. 574-89.

Distemper convulsions yield especially well to this therapy; in the latter case, the treatment is repeated over a period of five to seven weeks.

PREGNANCY TEST FOR MARES

Gestation in mares may be determined quickly by means of a chemical test.[126] At least four months must have passed since the mare has been bred, before the test can be applied. To the specially prepared urine, sulphuric acid is added. When the follicular hormone is present, a greenish coloration will appear in the urine, indicating that the mare is pregnant. Urine of stallions, geldings and sterile mares does not give this reaction.

HORMONES IN THE EMBRYONIC FLUID OF COWS

The sexual hormones were demonstrable in the allantoic fluid in 17% of the cases.[127] Sexual hormones could not be demonstrated in the amniotic fluid. The sex of the fetus has no influence upon the content of sexual hormones in the fetal fluid. The most favorable time for the demonstration of sexual hormones in the embryonic fluid is from the third to the fifth month of gestation.

RETAINED AFTERBIRTH IN THE COW

The habit of pulling violently at a calf as soon as it begins to appear at the vulva is one of the causes of retained afterbirth, the author[129] believes. Cows that calve normally, those calving slowly, unmolested, and dystocia cases do not suffer from retention of the placenta as frequently as those helped by premature traction.

It seems that prolonged and repeated uterine contractions that expel the fetus from the genital path slowly prepare for the expulsion of the envelopes by loosening the principal part of them from the excentric zone of the cotyledons. Uterine inertia is the retaining factor. It is the uterine contractions of parturition, not the *post partum* contractions that disassociate the placentae.

In addition to this circumstance, the most frequent cause of retained afterbirth rests in the presence of abnormal placental adhesions, of which there are two kinds: (1) The envelopes which are atrophied, thin, fragile, fibrous, inelastic and poorly vascular. They cover the cotyledons so intimately that it is not possible to detach the adhesions without tearing them. On the maternal side the cotyledons are friable, inelastic, without vitality and their "feet" are soft and fragile. (2) In certain cases the placental tufts are affected with an old suppuratve inflammation.

Should a retained afterbirth be removed manually? No, is the answer. Where there are abnormal adhesions as in the majority of cases of retention, it is impossible for the most robust, patient and adroit practitioner to accomplish removal to advantage; that is to say, total removal, aseptically, without tiring the animal and injuring the uterus at least a little. As a consequence, the removal is incomplete and useless and causes a metritis that brings ill health and may even be fatal. Moreover, it is always the adhesions at the depth of the horn that remain adherent. The small size of that portion does not facilitate expulsive contractions, nor does it prevent closure of the cervix. The retroflex of the anterior part of the horn hold it imprisoned. The mass of envelopes that keeps the cervix open is gone and the closed cervix renders irrigation ineffective. The retained part putrefies *sur place* and starts an infection that is dangerous owing to its proximity to the oviduct and peritoneum, and if peritonitis does not ensue, the victim is generally rendered sterile because of a chronic, incurable salpingitis. Therefore, since removal cannot be complete it is preferable to forego the attempt and thus save the uterus additional infection and injury that is disadvantageous in any case and often critical.

[126] Cuboni, E., 1936. Uber eine schnelle Trächtigkeitrdiagnose bei der Stute; (Rapid Diagnosis of Gestation in Mares); *Berl. Tierärztl. Wchuschr.*, 22, pp. 357-58.

[127] Scheibe, H., 1936. Uber den Nachweis der Sexualhormone nach der Küstschen Methode in Fruchtwasser der Rindes; (Demonstration of Sexual Hormones in the Embryonic Fluid of Cows), *Tierärztl. Rundsch.*, 42:29, pp. 557-60.

[129] Moutaux, M. Dr., 1935. Non delivrance chez la Vache. (Retained Afterbirth in the cow); *Recueil de Médecine Vétérinaire*, 111:10, October 1935.

INFECTIOUS EQUINE ENCEPHALOMYELITIS

From 1922, when Borna disease was first declared a reportable disease in Germany, until 1933, 4,300 cases were reported in Wurtenberg.[130] Among these, 3,620 died of the disease or were killed as hopeless. In 1931 six hundred cases with 571 fatal ones occurred. Attempts at immunization began in 1925 on rabbits inoculated with cerebral substance of infected horses. In 1927 immunization was practiced in horses, and appeared to be satisfactory.

It was soon found that material obtained from the cerebrum of horses killed for the purpose was better than that taken from cadavers. The technique consisted of skinning the head, removing the mandible and nasal portion with a saw and dissecting away the musculature, after which the cranium, wrapped in a cloth soaked in alcohol and 0.5% of formalin solution was dispatched immediately to a competent laboratory.

After singeing the cranium with a flame, the brain is lifted out as rapidly as possible under strict asepsis. When the cerebellum, bulb, dura and large vessels are removed, various particles of the brain tissue are taken for anaerobic and aerobic incubation. The rest is ground and mixed with a liter of sodium chloride solution (8.5 to 1,000) and glycerine, equal parts, and shaken briskly for a long time in a three-liter jar, after which it is set aside for 24 hours to await the results of incubation. If the cultures remain sterile, the emulsion is filtered to remove the large fragments. The filtrate is then brought up to two or three liters (depending upon the size of the brain) by adding more salt and glycerine solution. The finished product is then poured into sterile 10cc vials. Purity is further assured by making new anaerobic and aerobic cultures and inoculating guinea pigs.

The liquid (vaccine) which is reddish-grey in color and thick, should be used as soon as possible, as it does not keep long. The dose is 20cc, repeated in 14 days and again in 28 days.

The author concludes that the 4,000 tests made up to the present time, justifies the hope that by amelioration of the vaccination, especially by reinforcing the antigenic power of the cerebral filtrate and by resorting to the judicious use of the method in winter time, followed by a vaccination at the time of the emergency, it should be possible to decrease the heavy losses sustained every year in Wurtenburg.

[130] Gminder, 1936. Tests on the Immunization Against Infectious Encephalomyelitis (Trans. title); *Berliner Tierärztlich Wochenschrift*, Abst. in *Annales de Médecine Vétérinaire*, 81:1, January 1936.

TUBERCULOSIS IN A DOG

Following recovery[134] from a typical catarrhal form of distemper, a dog was found to exhibit enlargement of and pus formation in the retro-pharyngeal lymph nodes. The pus smear as well as the animal inoculation yielded tubercle bacteria. Actual symptoms of tuberculosis were not observed. It is assumed that either distemper lowered the resistance toward tuberculosis, or that the tuberculosis abscess was the result of a metastasis of a primary focus which evaded detection.

BIOLOGICAL PREGNANCY DIAGNOSIS

The examination of the blood[136] for the presence of hypophysis anterior lobe hormone, and of the urine for the presence of folliculin gives practical values from the seventh to the twentieth week of pregnancy. The increase of the hormone content will sometimes occur later than the seventh week, and sometimes will continue up to the seventh month. In infantile mice, injected with blood serum, the Allen-Dorsy test will remain positive for a much longer period, at times, than the hypophysis anterior lobe hormone reaction in the ovary. In advanced stages of pregnancy, the more reliable method is the determination of folliculin in the urine; it can be found, as a rule, as early as nine weeks, and only exceptionally as late as 100 days.

[134] Eenink, W H. 1935. Tuberculosis as a sequel to dog distemper. (Transl. title.) *Tijdschr. v. Diergeneesk.* 62: 1297-1298.

[136] Kaay, F. C. v. d., Jaarsma, R., and Groothuis, J. 1936. Biological pregnancy test in domestic animals. (Transl. title.) *Tijdschr. v. Diergeneesk.* 63: 1 pp. 1-17.

DOGS NEVER INSANE

Dogs are distinctly lacking in mental function and, therefore, cannot become insane.[131] Neither abnormal inner emotional experiences, which form the basis for the term "insane", can be diagnosed in animals, nor can normal emotional experiences be diagnosed in animals with any degree of accuracy. All cases of so-called insanity in dogs, when analyzed and scrutinized carefully, could always be traced either to disturbances of normal behavior or to certain definite diseases of the thyroid gland, the sexual glands, or the central nervous system.

CRAMPS IN SILVER FOXES

Silver foxes often suffer from cramps.[132] This malady, which may affect young as well as old foxes can often be traced to the effect of parasites and toxins. Frequently, however, the cause remains a riddle. Grini thinks it possible that the cramps are merely a symptom of tetany and of epilepsy. He states that calcium metabolism plays an important rôle in this disease. Vitamin D and parathyroid hormone are of great importance for the calcium intake of the body. A parathyroid extract, administered per os, gave the author satisfactory results in silver fox cubs.

MORTALITY FROM REMOVAL OF FOREIGN BODIES

Describing the technic of Roentgen ray[133] examinations of the stomach and intestinal tract, Berge mentions that of 17 cases of foreign bodies in the thoracic part of the esophagus, the foreign body could be removed by operation in 86.7% of the cases. The removal of the foreign body from the stomach was successful in 62.5%; from the intestine in 46% of the cases.

[131] Baege, 1936. Gibt es geisteskranke Hunde? (Are there insane dogs?) *Der Hund* 8:182-183.

[132] Grini, O. 1936. Convulsions in silver foxes. (Transl. title.) *Norsk Vet. Tidsskr.* 48 (3):113-115.

[133] Berge, E. 1936. Die Roentgendiagnostik bei den Fremdkörpererkrankungen von Kleintieren. (X-ray diagnosis of foreign bodies in small animals.) *Deutsche Tierärztl. Wchuschr.* 44. 22c pp. 388-394.

DILATION OF THE ESOPHAGUS IN DOGS

A three-year-old, Gordon setter exhibited vomiting, accompanied by a peculiar gurgling sound, after every meal.[135] Clinical examination and Roëntgen ray examination revealed dilation of the esophagus. The dog died a few months later. Dilation of the esophagus was also observed in a five-weeks-old Airedale terrier, which, too, died two weeks later.

VACCINATION CONTROLS RABIES

As a result of the prophylactic vaccination of 871 dogs by the Veterinary Experiment Station in Zagreb, not a single case of rabies was observed, although the district was a hotbed of a rabies epizootic in previous years.[137] Moreover, during the period of observation, rabid dogs were known to have traveled through the vaccinated area. The vaccine is entirely harmless. The experiment has clearly demonstrated that vaccination on a large scale is feasible. Mention must be made that the number of bitten dogs and of Pasteur treatment of human beings fell to a minimum after the vaccination.

GASTRIC DYSFUNCTION IN CATTLE

Cases of dysfunction of the stomach of cattle were observed.[138] One type of dysfunction was characterized by an increase in the size of the omasum and abomasum; the other type was characterized by a disturbance of the function of the pylorus. The clinical symptoms as well as the anatomical lesions resembled those observed after experimental disconnection of the abdominal branch of the nervus vagus. The prognosis in such cases is absolutely unfavorable. Emergency slaughtering is to be advised.

[135] Jong, J. de 1935. Dilation of the esophagus in dogs. (Transl. title.) *Tijdschr. v. Diergeneesk.* 62: 1248-1249.

[137] Kucely J. 1935. Extermination of rabies in the district of Kostajnica. (Transl. title.) *Jugoslav. Vet Glasnik* 15: 10: 606.

[138] Lagerlöf, N., and Hoflund, S. 1936. Störungen besonderer Art in den Funktionen der Wiederkäuermägen. (Unusual types of disfunction of the bovine stomach. *Munich. Tierärztl. Wchnschr.* 87:22 pp. 259-262.

Book Review

Handbook for Veterinary Surgeons, by Fred Bullock, LL.D., Barrister at law; author of The Law Relating to Medical, Dental and Veterinary Practice. Third edition, 302 pages cloth bound. Baillière, Tindall & Cox, London, 1936. $2.00. (Complete address, Messrs. Ballière, Tindall and Cox, 7 and 8, Henrietta Street, Covent Garden, London, W. C. 2, England.)

Ostensibly written for British veterinarians, some statements and suggestions, naturally, do not apply strictly to conditions of veterinary practice in the United States. Nevertheless, the various chapters on professional conduct, including the chapter "Procedure in Courts of Law," by reason of the soundness of the ethics propounded, make this handbook exceedingly valuable to any veterinarian regardless of nationality. To the newly graduated veterinarian of our own country it supplies much valuable information and advice. We quote at random the following bits of wisdom:

"Members of any profession find that their practice flourishes in proportion to the care and attention they devote to it. It is equally true that the profession itself flourishes best when its progress is stimulated by the interest of a large proportion of the individuals who compose it. The young graduates of today will be the main body of the profession a few years hence, and they are earnestly advised in their own interests not to neglect any opportunity of cultivating both social and scientific intercourse with other members of the profession."

"No one who wishes to keep abreast of the advances in veterinary science can afford to neglect the regular reading of the professional journals. They record for him, and thus enable him to benefit by, the results of the experiences and researches of others, at home and abroad."

"If an accident should occur during an operation, and the patient be injured to the detriment of the owner, an action for negligence might follow. The operator is expected to anticipate and guard against all reasonable consequences, but he is not expected to anticipate and guard against that which no reasonable man would expect to occur."

"If a member [of the veterinary profession] is called upon to see a sick animal which is already in the care of another veterinary surgeon, he should decline to attend except as a consultant. If, however, the veterinary surgeon conducting the case refuses a consultation, and the owner states that he no longer desires his services, the member called in may agree to attend on condition that the first member is informed in writing that his services will no longer be required. In such cases the hint may not be out of place to inquire whether the client has yet paid the fees of the practitioner first called in. It is not unknown that some persons determine to change their veterinary surgeon when he begins to press his fees."

"The owner of a sick or injured animal is usually impatient to know at once what is the matter, but the young practitioner will be well advised in any difficult case to wait for the development of more certain symptoms before coming to any decision. There is no compulsion to express a decided opinion on the spur of the moment."

"In the capacity of a witness to facts it is improper to express any *opinion* on the facts; it is for the Court to form an opinion or to draw a conclusion from the facts proved. If called as a common witness, therefore, he should, as a rule, refuse to express an opinion if Counsel should ask for it. It may, however, well be that the matter on which his professional opinion is desired is plain and simple, and in such a case, if Counsel presses for an opinion, it may be given. In that event the witness becomes an expert witness. It is obvious, nevertheless, that though the qualified veterinary surgeon is an expert on all general matters relating to his profession, yet there will always be special questions on which the general practitioner cannot properly be said to be an expert; and as it behooves every witness to give his evidence with the utmost caution, if he knows himself not to be an expert on the matter in question, he should decline to express an opinion, giving as the reason that he was not called as, and is not in fact, an expert in this special sense."

Adopting one's conduct in conformity with the ethical principles laid down in this book, one is bound to raise not only one's personal standing in the community, but by setting an example of ethical conduct the standing of the entire profession will, likewise, be raised in the eyes of the general public. Bullock's "Handbook for Veterinary Surgeons," therefore, deserves wide distribution among veterinarians in general.

THE RIGHT MAN BUT THE WRONG JOB

In the caption under the halftone of Dr. Carl Fauks, page 422, October issue of VETERINARY MEDICINE, it stated: "Inspector in Charge, Tuberculosis Eradication." Dr. L. J. Allen (page 444) is in charge of TB eradication in Oklahoma.

CORRECTED DATE OF MEETING

The 23rd annual meeting of the Eastern Iowa Veterinary Association will be held in Cedar Rapids, October 20 and 21, 1936, and not one day later as previously published.

CIVIL SERVICE EXAMINATION

An examination for appointment to the position of Junior Veterinarian, in the Bureau of Animal Industry, United States Department of Agriculture, is announced.

Applications must be on file with the United States Civil Service Commission not later than October 19, 1936. Application forms may be obtained from the Civil Service Commission or at any first class post office. Applicants must be graduates of a veterinary college of recognized standing and must not be over 45 years of age, unless granted preference because of military service. The salary is $2,000 a year.

C. J. Henderson of Newman Grove, Nebraska, aged 54, died on June 30, 1936 at the Lutheran Hospital, Norfolk, Nebraska, as a result of being bitten by a horse on the left forearm. Streptococcic infection developed shortly, causing his death. He was a graduate of the St. Joseph Veterinary College, '18, and also a graduate pharmacist. He had practiced at Newman Grove since 1919.

Doctor Henderson is survived by his widow, two daughters, one son, three sisters and three brothers.

MICHIGAN PLANS UNIQUE SHORT COURSE

The Fourteenth Annual Post-Graduate Short Course for Veterinarians will be held Jan. 25-29, 1937, at the Michigan State College.

The plan this year is to conduct symposia on the rapid agglutination test for Brucellosis, vaccination against Brucellosis and the rapid plate whole blood agglutination test for pullorum disease. What is known about the manufacture of the antigens used in the agglutination tests, and the most effective use of the antigens in the testing of blood samples will be presented, also what is known about vaccination in an effort to control Brucellosis in cattle and other animals will be reviewed.

It is hoped that all veterinarians who can do so, whether practitioners, research men, regulatory workers, or commercial men, will avail themselves of this opportunity to profit by sitting in on the conferences, and more especially, to contribute to the discussions. Veterinarians from the United States and Canada are invited.

The program will not be confined to these subjects, but it is hoped to emphasize these subjects sufficiently, that all veterinarians interested will be attracted. Since the meeting will not be held for some months, suggestions for the program will be welcomed.

WARD GILTNER.

East Lansing, Mich.

ARMY VETERINARY SERVICE

The promotion of each of the following-named captains, Veterinary Corps, to the grade of Major, with rank from August 29, 1936, is announced:

Herbert M. Cox
Laurence R. Bower

Captain Austin T. Getz, is relieved from his present assignment and duty at Langley Field, Va., effective upon the arrival of Major Nathan M. Neate, V. C., and will proceed to New York, N. Y., and report to the commanding general, N. Y. Port of Embarkation, for temporary duty until such time as will enable him to sail on the transport scheduled to leave that port on or about December 16, 1936, for San Francisco, Calif. Upon arrival in San Francisco will report to the commanding general, Ninth Corps Area, for temporary duty at Fort Mason, Calif., until such time as will enable him to sail on the transport scheduled to leave San Francisco on or about February 2, 1937, for the Philippine Department, and upon arrival in that department will report to the commanding general for duty with the Veterinary Corps.

First Lieut. Walter T. Carll is relieved from further assignment and duty at the N. Y. Port of Embarkation, Brooklyn, N. Y., effective on or about September 25, 1936, and will then proceed to Fort Hoyle, Md., for duty.

Captain Richard G. Yule is relieved from duty at Fort Myer, Va., effective on or about October 15, 1936, will then proceed to Fort Moultrie, S. C., and report to the commanding officer for duty, and in addition will act as attending veterinarian at Fort Screven, Ga.

So much of par. 30, S. O., 166 W. D., 1936, as assigns Major Irby R. Pollard, V. C., to duty at Fort Benjamin Harrison, Ind., is amended so as to assign him to duty at Fort Clark, Texas, effective upon completion of his present tour of foreign service.

Major John W. Miner is assigned to duty as attending veterinarian to Ogden Ordnance Depot, Ogden, Utah, in addition to his other duties at Fort Douglas, Utah.

The promotion of Major Daniel S. Robertson to the grade of lieutenant colonel with rank from August 3, 1936, is announced.

Lt. Col. Clell B. Perkins is relieved from his present assignment and duty at Fort Jay, N. Y., and from additional duty as attending veterinarians at Forts Slocum and Wood, N. Y., the harbor defenses of eastern and southern New York and Sandy Hook, N. J., and headquarters, Second Corps Area, effective at such time as will enable him to comply with this order. He will sail from New York, N. Y., on or about January 5, 1937, via Government transportation, for the Philippine Department, and upon arrival will report to the commanding general for assignment to duty with the Veterinary Corps.

Major Nathan M. Neate is relieved from fur-

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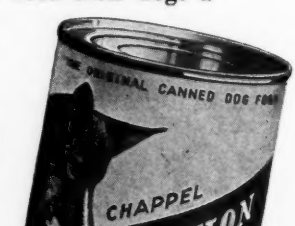

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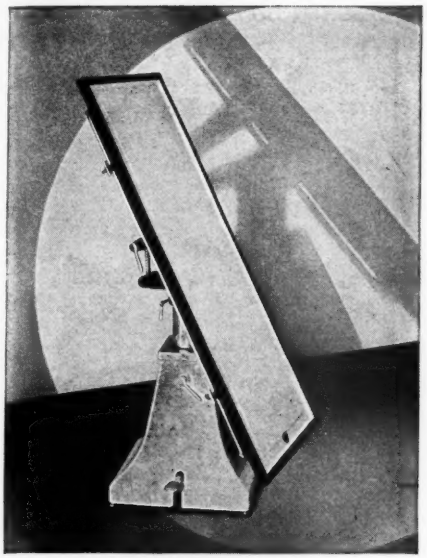

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ther assignment and duty at the Army Medical Center, Washington, D. C., will proceed to Langley Field, Va., and report to the commanding officer for duty.

The following-named officers of the Veterinary Corps are directed to report to the commandant, Medical Field Service School, Carlisle Barracks, Pa., on or about October 10, 1936, for temporary duty, for the purpose of pursuing the advanced course of instruction. Upon completion of same, about December 19, 1936, to return to their proper station.

Major Seth C. Dildine, N. Y. Port of Embarkation, Brooklyn, N. Y.

Major Joseph F. Crosby, Fort Devens, Mass.

Major Kenneth E. Buffin, Carlisle Bks., Pa.

Major Everett C. Conant, V.C., died at Fort Reno, Okla., September 18, 1936.

Major Conant was born at Passaic, N. J., December 8, 1895, and received his degree of Doctor of Veterinary Medicine from the University of Pennsylvania in 1917. He entered the service as a second lieutenant on July 16, 1917, and served continuously until the date of his death, having attained the grade of major on August 3, 1931.

After returning from service with the A. E. F., Major Conant served at various stations through-

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out the United States, including the Army Transport. He was an Honor graduate from the Army Veterinary School in 1921. Just prior to going to Reno, Major Conant completed a course of instruction at the University of Kentucky in the science of breeding, and clinics.

He is survived by his widow.

Veterinary Reserve Corps

New Acceptances: First Lieutenants, Allen Fred Ernest, Hampton, N. H.; Bailey, Orlen Leighton, Spokane, Wash.; Bate, Louis Bloyce, Sacramento, Calif.; Bradshaw, Nathan D., Greenwood, Miss.; Fremont, Martin Harold, San Francisco, Calif.; Gilyard, Richard Taylor, Waterbury, Conn.; Johnston, Elmer David, Astoria, N. Y.; Oglesby, Wm. Thomas, Baton Rouge, La.; Pringle, Everett Gittings, Greensburg, Pa.; Smith, Jean Van Tassell, Norwalk, Conn.; Stewart, Russel James, Longmont, Colo.; Treman, Claire Eugene, Rockwell City, Iowa; Winston, James Seemann, West Hollywood, Calif.; Kingdon, Earl Goss, Salt Lake City, Utah; Smith, Ivan, South Omaha, Nebr.; Tamoglia, Thomas William, Denver, Colo.; Winsor, Frank Reed, Montgomery, Ala.

Promotions: To Major—Horning, Jackson Gilbert, Houston, Tex.; To First Lieutenants—Anderson, Robert Jewell, Marshall, Tex.; Ballenger, Ottis Elmo, Eastanollee, Ga.; Boardman, William, Sheffield, Mass.; Grossman, George Dewey, Gambier, Ohio; Kenaston, Glenn Harry, San Mateo,

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To First Lieutenants—Bolin, Fonsoe Marion, Corvallis, Ore.; Cameron, Bertram Novell, Middleboro, Mass.; Curry, Ray, Selma, Kans.; Fischer, Oscar Fredk. Jr., Sacramento, Calif.; Golden, Vernon Verle, Longmont, Colo.; Hales, Marvin Rufus, Olympia, Wash.; Presler, Donald James, Syracuse, N. Y.; Reed, Irvin Theodore, Auburn, Ala.; Rogoff, Edward Abraham, Ozone Park, N. Y.; Shives, Leo Sigel, Hancock, Maryland; Solomi, Phillip Anthony, Cleveland, Ohio; Spangler, Harold Monroe, Somerset, Ohio; Torrey, Philip, East St. Louis, Ill.; Zickefoose, Frederic Samuel, Rossville, Kans.

New assignments to active duty with CCC: First Lieutenants—Warnock, Robert S., Chicago, Ill.; Brown, Robert James, Ft. Leavenworth, Kans.; Cairy, Clyde Frank, Ft. Snelling, Minn.; Wiswell, Wilbur Harold, Ft. Des Moines, Iowa; Peterson, Harold O., Seattle Q.M.D., Seattle, Wash.; Henkel, Ernest L., Salt Lake City, Utah.

Termination of Assignment with CCC: Capt. Horace Leslie Anderson, Ft. Des Moines, Iowa.

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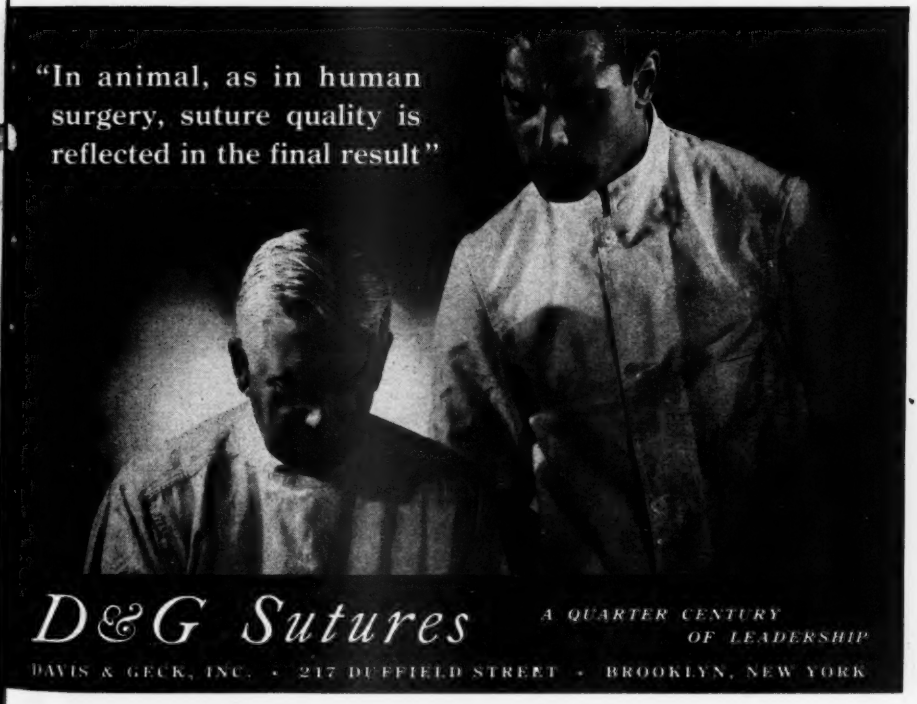
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